Safe Spaces for Teenage Girls in a Time of Crisis*

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Abstract

Adolescent girls face disadvantages across the developing world stemming from limited agency over their bodies and barriers to investing in their human capital. We study how these outcomes are shaped in times of aggregate crisis, in the context of the 2014-6 Ebola epidemic in Sierra Leone. This is a setting in which adolescent girls have long faced disadvantage because of a high prevalence of sexual exploitation and violence towards them. Our study is based around an evaluation of a club-based intervention for young women implemented during the epidemic. We track 2700 girls aged 12-18 from the eve of the epidemic in 2014 to just prior to when Sierra Leone was declared Ebola free in 2016. The club-based intervention provides a safe space where girls can spend time away from men, receive advice on reproductive health, vocational training and/or microfinance. During the epidemic all schools were closed. We show that without the protection of time in school, in control villages teenage girls spent more time with men, pregnancy rates rose sharply, and their school enrolment dropped post-epidemic. The provision of a safe space breaks this causal chain: it enables girls in treated villages to allocate time away from men and reduce out-of-wedlock pregnancies. These effects are more pronounced where girls lose access to other available safe spaces during the epidemic, where the intervention also increases school re-enrolment rates post-epidemic. To further pin down mechanisms, we exploit a second layer of randomization of input bundles offered by clubs. This reinforces the idea that the safe space component is critical to driving outcomes for teenage girls. Our analysis has implications for school closures during health crisis in contexts where young women face sexual violence, highlighting the protective and lasting role safe spaces can provide in such times. *JEL: J13, J24.*

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1 Introduction

Gender inequalities in well-being are pronounced across the developing world. Some of the most important gender gaps stem from women having limited agency over their bodies and facing barriers to investing in their human capital [Field and Ambrus 2008, Duflo 2012, Jensen 2012]. An established body of experimental evidence has evaluated interventions designed to empower girls and young women in terms of their reproductive health and skills. Nearly all of this work establishes impacts in periods of relative economic stability. What is far less known is how to protect girls and young women in times of aggregate economic crisis. This is a critical gap in knowledge both because low-income countries are more susceptible to aggregate shocks – say through commodity price fluctuations, conflict, climate change and viral epidemics – and because in times of crisis, previously hard-earned gains in women's empowerment are often quickly erased [Doepke *et al.* 2012, Duflo 2012, Jayachandran 2015].[1]

This paper brings together the study of these issues in the context of the 2014-16 Ebola epidemic in Sierra Leone, described as the *"longest, largest, deadliest, and...most complex [Ebola outbreak] in history"* [UNDG 2015]. The outbreak affected Sierra Leone, Guinea and Liberia, infecting 28,652 individuals, with 11,352 deaths [CDCP estimate, April 2016]. Sierra Leone was the most affected country, hosting half of all cases, with severe consequences for the economy and public health infrastructure. Rapid contagion forced the government to implement now familiar social distancing policies during the epidemic: village lock-downs and travel bans, and all primary and secondary schools were closed through the 2014-15 academic year.

Sierra Leone is a setting in which young women have historically faced severe socioeconomic disadvantage. As Panel A in Figure A1 shows, on the eve of the outbreak, Sierra Leone ranked near the global bottom of the UNDP Gender Inequality Index.[2] Relative to the Sub-Saharan Africa average, it has high rates of adolescent fertility (Panel B) and the highest rate of maternal mortality in any country for which data exists (Panel C). This is partly driven by the extremely low levels of public health care provision (Panel D): pre-epidemic there were 0.2 doctors and 3 nurses per 10,000 people (the corresponding figures for most OECD countries are 30+ doctors and 100+ nurses), in a country with an estimated 1.4 million women of child-bearing age and 1.1 million under-five children. According to the WHO, teen pregnancy is one of the leading causes of death for mothers in Sierra Leone. It is also a setting where there is a high prevalence of sexual exploitation and violence towards young women. For example, the 2013 DHS from Sierra Leone reported that 51% of ever-married women aged 15-49 had experienced physical, sexual, or emotional violence committed by a husband or partner.

[1] Examples of studies evaluating interventions to improve the reproductive health and skills of girls and young women in low-income contexts include Baird *et al.* [2011], Duflo *et al.* [2015], Ashraf *et al.* [2020], Bandiera *et al.* [2020], Dhar *et al.* [2020], Edmonds *et al.* [2020] and Buchmann *et al.* [2023].

[2] This index aggregates information on maternal mortality rates, adolescent fertility rates, education by gender, female held parliamentary seats, and gender inequality in labor market participation.

That girls aged 12-18 face a range of disadvantages in our setting is also starkly quantified in our baseline data: pre-epidemic, around a third are in a relationship with 8% being married – the average age at marriage is just under 15 with husbands being almost twice as old. Despite their teenage years, 20% have children, 13% have children out-of-wedlock, and the average age of first pregnancy is 15. The majority are sexually active, spending 3 hrs/per week with sexual partners, and the minority using contraceptives. For those in relationships, around a third report having experienced some form of intimate partner violence. For girls both in and out of relationships, 7% of girls report experiencing unwanted sex in the year prior to baseline.

During the Ebola epidemic, the need to enforce social distancing measures through school closures could have especially acute consequences for teenage girls. Without the protection of time in school, they can become more exposed to sexual relationships with men and early pregnancy [Amnesty International 2015, Behrman *et al.* 2017, Evans *et al.* 2023]. Furthermore, just before schools were due to reopen in April 2015, the Ministry of Education announced the continuation of a pre-Ebola policy: that 'visibly pregnant girls' would be unable to reenrol. These factors combine to link short run school closures during the epidemic, pregnancy risk during the epidemic, and long run human capital accumulation for teenage girls, and so entrenching disadvantages to an even greater extent.

It is in this context of vulnerability of young women and a fragile state dealing with aggregate health and economic crisis, that we evaluate an intervention targeted to girls and young women. The intervention is known as the Empowerment and Livelihood for Adolescents (ELA) program, and is delivered by the NGO BRAC. It has two components: (i) the provision of a physical safe space – a venue for young women to safely gather and socialize away from men; (ii) the delivery of life skills training, vocational training and microfinance from these safe spaces. Our randomized control trial and data collection exercise were planned well before the onset of the Ebola epidemic, intending to build on our earlier work showing positive effects of the ELA intervention in Uganda in times of economic stability [Bandiera *et al.* 2020]. The fact that our evaluation was underway at the time of the outbreak was entirely coincidental: the ELA program is not intended as a response to the crisis.

The safe space component of the ELA intervention can have especially high lifetime returns for girls. Most directly, without the protection of time in school during the epidemic, ELA clubs offer girls a safe space where girls can meet and socialize, providing an alternative to spending time with men during the epidemic. This can reduce the likelihood of teen pregnancy, and as a result, girls are more likely to reenrol in school post-epidemic. We study the causal chain of outcomes that form this link: time spent with men spent engaging in sexual activities, teen pregnancy, and re-enrollment back into school post-epidemic. The cohort of girls aged 12-18 at baseline are our primary focus because they are most affected by school closures and any subsequent loss of protection of time in school.

Our evaluation sample comprises 200 villages in four districts of Sierra Leone. We conducted

a census of these villages in October 2013, to draw a random sample of girls aged 12 to 18 and thus eligible for ELA club membership. The intervention was randomly assigned to 150 villages with the other 50 held as controls. The experimental design includes three treatment arms: in T1, ELA clubs only provide life skills training; T2 is as T1 but clubs additionally provide vocational training; T3 is as T2 but clubs additionally provide microfinance. Common to all treatment arms is that ELA clubs provide a safe space for girls and young women to meet in privacy from men.

Our baseline was conducted between February and May 2014. Fieldwork was completed a week prior to the first case of Ebola being reported in Sierra Leone. The baseline survey covered 2,783 girls aged 12-18, recording information on their pregnancies/risky behaviors, time use, schooling and labor market activities.

With fieldwork suspended during the crisis, we implemented phone surveys to gather information on club functioning in treated villages, and a leaders survey in all villages to record the localized health impacts of Ebola, and policy responses. Our monitoring data confirms there was an extensive roll out of the ELA program despite the crisis: 70% of clubs opened on time (by September 2014), although the provision of life skills is more patchy, and the roll out of vocational training only took off after travel quarantines were lifted in January 2015. There was also high demand to participate: 66% of girls in treated villages ever participated in an ELA club meeting or activity (versus 4% in control villages).

After fieldwork restrictions were lifted, our endline survey was fielded between February and May 2016, well after schools had reopened. We measure post-epidemic outcomes for teenage girls related to pregnancies/risky behaviors, time use, schooling and labor market activities.

Our analysis exploits the timing of events and randomized roll out of ELA clubs to document: (i) changes in the economic lives of girls in control villages over the course of the epidemic; (ii) whether the availability of ELA clubs mitigated these impacts in treated villages, focused on the key causal chain of teen pregnancy, time spent with men, and re-enrollment into school. We divide these two lines of inquiry into four main batches of results.

First, we use our baseline and endline data to evidence how the epidemic impacted teen pregnancy and school enrolment for girls aged 12-18 at baseline in controls. We find the likelihood of pregnancy increased significantly during the epidemic relative to a counterfactual group with the same age composition two years prior to the Ebola outbreak.[3] In the two years pre-epidemic, 13% of young girls became pregnant. In the two-year window of the crisis, 19% becoming pregnant. For this cohort, at endline (post-epidemic), when all schools had reopened, enrolment fell from 72% to 59%, with falls observed at all ages. Pre-epidemic, 25% of girls listed pregnancy as the main cause of why they were no longer in school. Post-epidemic, pregnancy is the modal explanation for drop out, given by 40% of girls. Finally, we establish a correlation between pregnancy and drop-outs: only 15% of girls who became pregnant during the epidemic enrolled in schools when

[3]For this exercise we use additional data collected from women aged 19-25 at baseline, from the same villages.

they reopened. In contrast, enrolment rates for those who did not become pregnant remained over 70% in the post-Ebola period.[4]

Our second batch of results again uses data only from controls to highlight the value to girls of having access to a safe space during the crisis. We do so by exploiting the fact that in rural Sierra Leone, Peripheral Health Units (PHUs) play a vital role in safeguarding adolescent girls from pregnancy risk because they provide adolescent-friendly spaces including a dedicated room for young women [Denney *et al.* 2016].[5] To measure the availability of such spaces when schools were closed, we use information on disruptions to the nearest PHU collected as part of our village leader survey in which respondents were asked to recall monthly information from July 2014 on whether the local PHU was closed or disrupted. A PHU is considered closed during the epidemic if it did not operate for at least one month between July 2014 and September 2015: 14% of control villages had their PHU close.

We document that girls in villages exposed to PHU closures during the epidemic are 14.1pp more likely to ever be pregnant between baseline and endline, corresponding to a 70% increase. This is largely driven by out-of-wedlock pregnancies that increase by 10.5pp for girls that lose access to PHUs. At endline, these girls report spending 1.26 more hrs/week with men than girls in villages that maintained access to PHUs, an increase of 39%. Finally, girls losing access to PHUs during the epidemic are 20pp less likely to be enrolled in school at endline, and 23.2pp more likely to report being in work. Exposure to PHU closures thus correlates to a speeding up the school-to-work transition for girls, in line with pregnant girls being unable to return to school.

These non-experimental findings related to the loss of PHUs suggest an important role for safe spaces for girls when schools closed. To causally study the impacts of safe spaces on teenage girl outcomes, we exploit the random assignment of ELA clubs. These serve as an additional safe space for girls and can thus potentially offset higher pregnancy risks faced during the epidemic.

Our third batch of results establish the ITT impacts of ELA clubs at endline. We find the availability of ELA clubs for teenage girls in treated villages significantly reduces rates of out-of-wedlock pregnancy by 3.2pp, or 23% of the baseline mean in controls. ELA clubs have pronounced impacts on girls' time use. Girls spend around 3.20hrs/week attending ELA clubs and this comes from substituting away from other social activities. Most importantly, girls in villages with ELA clubs significantly reduce time spent with men by .55hrs/week, a 17% reduction over the baseline. However, on average across all treated villages, the presence of ELA clubs does not increase school enrolment at endline.

[4]It is generally recognized that even if there was some degree of recovery in enrolment rates post-pandemic, they did not recover to their pre-pandemic levels. Following Malmendier and Willigrod [2023], we later replicate some of this descriptive evidence using the 2018 Sierra Leone Integrated Household Survey (SLIHS), a nationally representative survey that records school enrolment from 2013/4 to 2017/8.

[5]These facilities represent the lowest tier of the Sierra Leonean health system. They serve a population of 500-5000 and are staffed by Community Health Nurses. In our evaluation sample, the average distance to the nearest PHU is 1.55 miles.

To drill down further to establish how ELA clubs shape outcomes for girls, we estimate heterogeneous impacts of ELA clubs as girls' underlying pregnancy risk varies during the epidemic depending on PHU closures, the alternative safe space to ELA clubs. We find that in villages where PHUs closed (i.e. high risk villages), the availability of ELA clubs reduces pregnancy rates by around half relative to control villages where also PHUs closed. These protective effects of ELA clubs are concentrated among out-of-wedlock pregnancies. ELA clubs do not shift pregnancy outcomes in low-risk villages where PHUs remained open, because girls can still access these safe spaces and the additional safe space provided by ELA clubs has no further impact.

On time allocation, time spent by teenage girls at ELA clubs does not differ across villages with and without PHU closures ($p = .833$). However, how this time is reallocated away from socializing activities differs markedly depending on the pregnancy risk faced by girls due to the closure of PHU safe spaces. In high-risk control villages, the time girls spend with men increases by 1.08hrs/week, but this increase is entirely offset in treated villages, where ELA clubs represent the only available safe space for girls. In low-risk treated villages, where girls can access both PHUs and ELA safe spaces, girls also spend significantly less time with men.

To complete the causal chain, we examine how these time reallocations translate into activities at endline. In high-risk control villages school enrolment falls by 17.5pp post-epidemic, relative to low-risk control villages. This fall is almost entirely offset in high-risk treated villages. The protective effects of ELA clubs during the epidemic ensure teenage girls enrol back into school post-epidemic, with no shift into work.

Our fourth batch of results dig deeper into mechanisms through which ELA clubs protect teenage girls, to try and isolate the impact of the safe space component. As life skills are part of the bundle in all treatment arms, we cannot experimentally separate out the value of safe spaces from life skills. To help separate the safe space and life skills components, we present two sets of results. First, we show other outcomes related directly to the modules covered in the life skills curriculum are unaffected by the presence of ELA clubs. This is true irrespective of the background pregnancy risk to girls during the epidemic. Second, we show that in high-risk villages, ELA clubs help girls maintain social ties – as a safe space might allow, rather than the life skills component of the intervention. The loss of friendship ties for those in high-risk villages is entirely offset when ELA clubs are available.

To establish whether the additional provision of vocational training and microfinance drives the documented effects of ELA clubs, we then exploit the second stage of randomization, where ELA clubs were assigned alternative input bundles for girls and young women. These additional activities could potentially increase the value of time at ELA clubs and thus further displace other activities, such as time spent with men. We find little evidence that outcomes for girls are differentially impacted across treatment arms. At endline, pregnancies, time spent at ELA clubs, time spent with men and in other socializing activities, school enrolment and transitions to work, do not significantly differ with the bundle of inputs provided at ELA clubs. Most notably, time

spent at ELA clubs is the same across treatment arms suggesting the value of ELA clubs is not strongly related to the provision of vocational training or microfinance over and above life skills. Rather the safe space component is key to protecting girls in times of crisis in this context where teenage girls are vulnerable to sexual abuse even pre-epidemic.

Our findings suggest that during the epidemic crisis, the provision of a safe space – either through PHUs or through ELA clubs when alternative safe spaces such as schools are closed – is sufficient to prevent kick-starting a causal chain for teenage girls of time spent with men, out-of-wedlock pregnancy, and school dropout. Our results echo the concerns of the international community [Amnesty International 2015], that teenage pregnancies represent one of the key channels through which the crisis permanently shifted young women's socioeconomic trajectories, entrenching disadvantages for women in this context.

Our analysis breaks new ground on the link between aggregate economic shocks and adolescent girl outcomes, identifying a simple but powerful intervention that can mitigate risks girls face in such times of crisis.

Prior to Covid-19, a nascent literature had begun to study behavioral responses of individuals, firms and governments during epidemics [Rasul 2020].[6] A key insight from research during the Covid-19 pandemic has been the severity and distributional consequences of learning losses for children from school closures [Agostinelli *et al.* 2022, Fuchs-Schündeln *et al.* 2020, Moscoviz and Evans 2022]. Our work builds on this but highlights an even more basic concern in settings where gender inequalities are severe, that is relevant to much of the developing world: losing protective time in school exposes girls to pregnancy risk, that has severe consequences for their ability to return to school and accumulate human capital. Unlike learning losses that at least have the potential to be remedied, shifts into pregnancy, child bearing and school drop-out likely have more irreversible impacts on the lifetime welfare of teenage girls [Field and Ambrus 2008, Buchmann *et al.* 2023].[7]

Our analysis in the context of Sierra Leone during the Ebola epidemic crisis is relevant for future work because viruses remain a major threat to human health. Over the last century, more deaths have been caused by viruses than all armed conflict combined [Adda 2016]. Given the long run incidence of highly infectious diseases is determined by urbanization driving closer contact

[6] This includes Adda [2016] on flu; Agüero and Beleche [2017] on H1N1; Bennett *et al.* [2015] on SARS; and Lautharte Junior and Rasul [2020] and Rangel *et al.* [2020] on Zika. Work on the Ebola epidemic in West Africa has focused on measuring real time impacts of the crisis on households and firms [Thomas *et al.* 2015, Bowles 2016, Glennerster *et al.* 2016, Casey *et al.* 2017], or exploiting quasi-experimental variation in the geographic incidence of Ebola to understand government responses [Fluckiger *et al.* 2019, Maffioli 2020].

[7] To the best of our knowledge, Archibong and Annan [2020] is the only other study that documents how gender gaps open up in such times, in the context of the 1986 meningitis epidemic in Niger. They show a significant reduction in years of education for school-aged girls relative to boys following the epidemic, driven by households marrying off daughters in order to claim bride prices. Methodologically, the paper closest to ours is Christensen *et al.* [2021]. They also overlay a pre-planned RCT in Sierra Leone with the epidemic shock. They document how interventions implemented pre-epidemic to improve accountability of health facilities, led to those facilities functioning better through the epidemic.

between human and animal populations, and rising global temperatures, we can expect them to remain a global threat for the foreseeable future. A common policy response to viral outbreaks is to use school closures as part of social distancing measures. Absent protective time in school, our findings show the importance of providing alternative safe spaces during such times for teenage girls in contexts where they are most vulnerable to begin with. This insight has direct relevance for ongoing discussions of whether optimal policy responses to viral outbreaks should differ in low- and high-income countries given differing trade-offs and state capacities, as well as issues that many countries are grappling with in terms of how health crisis can have hugely differential impacts across generations.

Although the importance of safe spaces has been discussed outside of economics [Ager *et al.* 2013], to the best of our knowledge causal evidence on the impacts of safe spaces in times of crisis remains scarce. This is despite mounting evidence of increases in violence against women during Covid-19 due to lockdown measures [Boserup *et al.* 2020, Leslie and Wilson 2020, Ravindran and Shah 2023], and pre-existing evidence on how women and children are vulnerable to violence in times of aggregate economic crisis more generally [Behrman and Weitzman 2016, Fraser 2020]. As we discuss in the final Section, this gives a new motivation for the provision of club-based activities beyond arguments related to them generating higher returns than individual-based activities through social interactions of members and providing a platform for intervention delivery at-scale [Diaz-Martin *et al.* 2022].

By evaluating the exact same ELA intervention in stable economic times [Bandiera *et al.* 2020] and in times of crisis, we add to discussions of the external validity of intervention evaluations when returns to interventions interact with aggregate shocks [Rosenzweig and Udry 2020]. We show there are positive returns to the ELA intervention in good times and bad, but the mechanisms through which these returns are generated differ: in good times the life skills and vocational training components both generate valuable returns to teenage girls and young women, while in times of crisis and without the protection of time in school, the basic safe space component of the intervention is critical to protecting girls.

Section 2 describes the Ebola epidemic and how its timing relates to our data collection. We then use our data from controls to document the rise in teen pregnancies over the epidemic, and the potential role that access to PHU safe spaces played in ameliorating this. Section 3 describes the ELA intervention. Section 4 presents ITT estimates on how the availability of ELA clubs impacted teen pregnancy, time use and school enrolment, and how these impacts varied depending on the underlying pregnancy risk faced by girls due to PHU closures. Section 5 uses the second layer of randomization of bundles of services within ELA clubs to pin down the mechanism through which ELA clubs have protective impacts on girls. Section 6 concludes by discussing spillovers onto older girls and young women and avenues for future research. The Appendix develops a model of safe spaces and time use before, during and after the epidemic, providing a lens through which to interpret the results, and presents additional empirical robustness checks.

2 Context

2.1 The Ebola Epidemic

Ebola Virus Disease (EVD or Ebola) is an acute hemorrhagic fever that can be fatal if untreated. Ebola first appeared in simultaneous outbreaks in South Sudan and the Democratic Republic of Congo in 1976. The virus is transmitted from wild animals and human-to-human transmission takes place via direct contact with the blood, secretions, organs or other bodily fluids of infected people, or with surfaces contaminated with these fluids (such as bedding or clothing). Transmission can also occur in burial ceremonies involving contact with the deceased body.

Sierra Leone was the country most affected by the 2014-6 epidemic, hosting about half of all cases. The virus is thought to have been brought into the country by an individual entering from Guinea around May 2014. By October 2014, it had spread to all 14 districts in Sierra Leone, with rapid contagion caused by high rates of geographic mobility and the use of traditional burial practices. Figure 1 charts the timeline of the epidemic from May 2014. The peak flow of cases occurred in December 2014, and it was only in July 2015 that the epidemic started to slow. Sierra Leone was declared Ebola free in November 2016, 42 days after the last patient was discharged. The WHO estimates there were $14,124$ cases in the country resulting in $3,956$ deaths. Hence, the 28% fatality rate is lower than in some earlier outbreaks, but the scale and spread of the outbreak in Sierra Leone was unprecedented.[8]

The epidemic had severe consequences for health care provision. The crisis eroded the human capital of health workers, shifted public trust in using health facilities [Evans *et al.* 2015, Christensen *et al.* 2021] and as we later document, forced the closure of some Peripheral Health Units, the first point of contact with the health care system for many in rural areas. The economic consequences were equally severe. In a year, GDP growth plummeted from $+8.9\%$ to -2.0%: border closures shut down international trade, internal travel bans resulted in the breakdown of domestic trade, and all periodic markets closed. The self-employment sector, accounting for 91% of the labor force, shed around $170,000$ jobs (with revenues for surviving enterprises falling 40%), and a further $9,000$ jobs were lost in wage employment [Evans *et al.* 2015, Thomas *et al.* 2015, Vargas Da Cruz *et al.* 2015, Casey *et al.* 2017].

2.2 Policy Responses

The Sierra Leoneon government used three policies to combat rapid contagion, all of which are now also familiar responses to Covid: (i) health workers were mobilized to record door-to-door cases and track contagion, and some health facilities were transformed into Ebola holding centers; (ii)

[8] For the 2014-6 outbreak, the WHO estimates Liberia had $10,675$ cases and $4,809$ deaths (a 45% fatality rate), and Guinea had $3,811$ cases with $2,543$ deaths (a 67% fatality rate). Funereal practices are argued to have played a major role in the spread of Ebola in Sierra Leone [Malmendier and Willigrod 2023 and references therein].

social distancing measures were used, including village lock-downs and travel bans; (iii) primary and secondary schools were closed through the 2014-5 academic year. As shown on the upper part of Figure 1, schools were closed in May 2014 and reopened in April 2015 as the epidemic began to slow (the school year runs from September to July).

School closures might have particularly acute impacts on girls. Without the protection of time in school, they can become more vulnerable to sexual abuse in the short run, thus limiting their longer-term accumulation of human capital [Amnesty International 2015, Behrman *et al.* 2017, UNICEF 2021, Evans *et al.* 2023]. These gender-specific consequences of school closures were compounded by the fact that just before schools were due to reopen in April 2015, the Ministry of Education, Science and Technology announced the continuation of a pre-Ebola policy, that 'visibly pregnant girls' would be unable to reenrol – a policy that further increased the long run cost of school closures for teenage girls due to heightened pregnancy risk without the protection of time in school.[9]

2.3 Data and Descriptives

Figure 2 shows the timeline of data collection, and how this relates to the timing of the epidemic and rollout of ELA club activities. Our data comes from 200 villages across four districts: Port Loko, Kambia, Moyamba and Pujehun, where 20% of the Sierra Leonean population resided pre-crisis. Villages in our sample are small and remote: on average, they comprise 90 households and are more than eight miles to the nearest market.

We first conducted a census in the 200 sample villages in October 2013, covering 94,338 individuals in 17,233 households. This was used to draw a random sample of girls aged 12 to 25 and thus eligible for ELA club membership. For the bulk of our analysis we focus on girls aged 12-18 because they are are most impacted by school closures. Our baseline was conducted between February and May 2014, ending just as the first cases of Ebola were being reported in Sierra Leone. The baseline survey covered 2,783 girls aged 12 to 18, corresponding to 27% of all those eligible to participate in ELA clubs, and recorded information on their pregnancies/risky behaviors, time use, schooling and labor market activities.

Time use data plays an important role in our analysis because time spent at ELA clubs can displace other activities. To minimize measurement error in time use, we gave respondents a finite number of objects (beans) representing the hours in a day and asked them to allocate hours to different activities including work, school, household chores, and leisure. For leisure activities, we asked respondents to split this further into time spent alone, time engaged in sexual relations with

[9] In May 2015, it was announced that an alternative 'bridging' education system would be established to allow pregnant girls to continue schooling, but in different premises or times to their peers. Other temporary measures, such as community learning centres and home-based approaches, were also implemented. At best, this bridging system varied in effectiveness, and did nothing to help pregnant girls find an alternative way to take national exams. A body of evidence has developed over the Covid pandemic to better understand remedial actions that can be taken to reduce learning losses when schools close [Moscoviz and Evans 2022].

men, with friends (outside of ELA clubs), and at ELA clubs. The baseline and endline surveys took place during the school year so respondents could feasibly have been attending school in the week of the survey.[10]

With the onset of the crisis and all fieldwork suspended, we implemented two phone surveys. The first was a monitoring survey to ELA club mentors in treatment villages conducted in June/July 2015, designed to provide information on club functioning. The second was a village leaders survey administered between June and October 2015, to provide information on attitudes towards girls and pregnancy, Ebola impacts on the village (the number of households quarantined, Ebola cases and deaths), and policy responses (such as the functioning of schools, health facilities, and other relief efforts).[11]

The village leaders survey reveals them to be extremely conservative, with stigma against teen pregnancy: the vast majority (over 95%) strongly agreed with the statement that 'Girls who are visibly pregnant have a bad influence on their non-pregnant peers'; only 12% strongly agreed with the statement 'Girls should be allowed to continue their education while pregnant'.

After fieldwork restrictions were lifted, the endline survey was fielded in person between February and May 2016 (so like the baseline, taking place during the school year). As Figure 1 shows, this is around six months after the inflow of new reported cases of Ebola declined to near zero, well after schools had reopened, but still before Sierra Leone was declared to be Ebola free (November 2016). The endline covered the same topics as the baseline, but with additional modules related to the crisis and experiences during it.

2.4 The Ebola Epidemic, Teen Pregnancies and School Enrolment

We use our baseline and endline data to present evidence based on girls in control villages, on how the epidemic impacted teen pregnancy and school enrolment.

Panel A of Figure 3 shows how the likelihood of teen pregnancy changed during the epidemic by comparing girls aged 12-18 on the eve of the epidemic to a counterfactual group with the same age composition two years prior to the Ebola outbreak (using data from older women also collected

[10]The question wording for the broader categories is, *"Now I would like you to do a simple exercise. Here on these cards are some ways you can spend your time in a typical week. Here are 25 beans. Please divide these beans between the cards according to how much time you spend in each activity."* For time use related to socializing, the question wording is, *"Here are the 25 beans again. Here on these cards are some ways you can spend your free (leisure) time. Please divide these beans between the cards according to how much time you spend in each activity." If there are any other activities not listed on these cards, you can write them on these blank cards."* The credibility of the time use data is underpinned by the fact that: (i) the number of beans recorded across categories summed correctly up to the initial allocation for 90% (99%) of respondents at baseline (endline); (ii) 87% of respondents report sleeping 5 to 10 hours per night. We convert time use measures into hours per week.

[11]The village leader survey collects data coded from focus group discussions. Prominent members of the socioeconomic and administrative life of the community attended these meetings, with the average focus group involving 11 participants (the minimum (maximum) was 5 (18)). 85% of these meetings were attended by a Chief (either a Paramount, Section, Regent or Village Chief). Village elders, women's and youth leaders, imams, pastors, head teachers, nurses and ELA club mentors were also invited.

from controls). The horizontal axis represents time in months, from either May 2014 (the start of the epidemic) or May 2012 (the start of the counterfactual two-year pre-epidemic period). At time zero, each sample includes only girls aged 12-18 in the reference year that had never been pregnant. The vertical axis measures survival rates, showing the share of girls in each group that have not experienced their first pregnancy, by month. For the epidemic sample, the first vertical dashed line shows when schools started to reopen and the second shows when Sierra Leone was declared Ebola free. Relative to the pre-epidemic counterfactual, pregnancy rates increase substantially for these girls, with the survival rates immediately diverging and doing so evenly over the crisis: a log-rank test of equality of the survival functions rejects the null of their equality ($p = .001$). In the two years pre-epidemic, 13% of young girls became pregnant. In the two-year window of the crisis, this rises by nearly half, with around 19% becoming pregnant.

Panel B then shows school enrolment rates by age: (i) at baseline in 2014 (pre-epidemic); (ii) at endline in 2016 (post-epidemic), when schools had reopened. Aggregate enrolment fell from 72% to 59%, with falls observed at all ages. Falls in enrolment are non-monotonic in age, being largest in absolute terms for those aged 15 at the onset of the epidemic. In relative terms, falls in enrolment are generally increasing in age.

Panel C shows reasons given for dropout from school. We compare reasons given by girls aged 12-18 that had already dropped out at baseline pre-epidemic, to those in the same age group that dropped out between baseline and endline, i.e., those that did not reenrol after schools reopened. Pre-epidemic, financial costs topped the list of reasons for dropout, with 50% of girls listing it as the main cause. Pregnancy was a distant second, mentioned by 25% of girls. Post-epidemic, the order is reversed: pregnancy is the modal explanation given by girls (40%) while less than one third of girls state costs are the reason for their dropping out.

Panel D shows a strong correlation between pregnancy and drop-outs: only 15% of girls who got pregnant during the epidemic enrolled in school when they reopened. In contrast, enrolment rates for those who did not get pregnant are over 70%. Taken together, the evidence from control villages indicates that teenage pregnancies rose quickly during the epidemic and many of these girls did not return to school when these reopened.

Figure A2 replicates this evidence using another data source: the 2018 Sierra Leone Integrated Household Survey (SLIHS), a nationally representative survey that records school enrolment from 2013/4 to 2017/8 [Malmendier and Willigrod 2023]. We restrict the sample to girls aged 12-18 in 2014 residing in our four study districts. To maintain sample sizes when we split by age, we retain both urban and rural areas (unlike our evaluation data that only covers rural areas). Using the SLIHS, Panel A of Figure A2 again shows a large divergence in the hazard of becoming pregnant for teenage girls over the two years of the epidemic, relative to girls two years earlier: by the end of the 24 month period shown in Panel A, 17% of teenage girls had conceived their first child, against a counterfactual of 11%. Panel B shows aggregate enrolment rates fell between pre- and post-epidemic periods from 65% to 61%, with falls observed at all ages, and the absolute and

proportionate falls increasing in age. Panel C shows reasons given for drop out in the SLIHS. As in our sample from control villages: (i) pre-epidemic, financial costs topped the list of reasons for dropout, with pregnancy being the second most common stated reason, mentioned by 27% of girls; (ii) post-epidemic, the order reverses: pregnancy is the modal explanation given by girls (57%) while less than one third of girls state costs are the reason for dropout. Panel D again shows a strong correlation between pregnancy and dropping out of school.[12]

The bottom line is that whether we use our survey data or the SLIHS, pregnancy and schooling outcomes are closely connected. The loss of schools as a safe space during the epidemic is one potential channel through which these increases in pregnancy could have been caused. To probe the possibility, we now consider how outcomes among girls in control villages vary depending on the availability of the most important alternative safe space for girls during the epidemic: Peripheral Health Units.

2.5 PHUs as Safe Spaces

In rural Sierra Leone, Peripheral Health Units (PHUs) play a vital role in safeguarding girls from pregnancy risk because they provide adolescent-friendly spaces including a dedicated room for young women. These facilities are supposed to be set aside for sexual and reproductive health counseling, distributing contraceptives, as well as providing a space for girls to spend their leisure time. However, given the extreme pressures the health system was under even pre-epidemic, it is unclear whether PHUs have the capacity to provide such additional services, or whether they operate solely as a physical safe space [Denney *et al.* 2016]. We assess this to some extent by examining how contraceptive use and sexual activity of girls correlates to PHU closures.[13]

To measure whether girls retained access to a PHU safe space during the epidemic, when the health infrastructure throughout Sierra Leone was under extreme pressure and schools were closed, we use information on disruptions to the nearest PHU collected as part of the village leader survey administered between June and October 2015. Respondents were asked to recall monthly information from July 2014 on whether the local PHU was closed or disrupted. This recall period this covers the key 15 months of the epidemic (Figure 1). A PHU is considered closed during the epidemic if it did not operate for at least one month between July 2014 and September 2015: 14% of control villages had their PHU close.

Table 1 shows village characteristics between those where the PHU remained open throughout

[12]For completeness, Figure A3 shows the same statistics for the 12 non-study districts in Sierra Leone: while the rise in teen pregnancies is less pronounced in these areas compared to our study districts, school reenrolment rates are lower post-pandemic for older teenage girls, pregnancy becomes the most important reason for drop out post-pandemic, and enrolment rates plummet among those that become pregnant since the start of the epidemic.

[13]The 2013 DHS data from Sierra Leone asks respondents about visiting health facilities (not limited to PHUs). In our four districts, 47% of those aged 15-25 report visiting a health facility in the 12 months prior to survey; among those aged 15-18 and using contraceptives, only 41% report accessing them through some government health center (other sources include a mix of private facilities, shops and outreach workers).

the epidemic and those where the PHU was closed. Panel A shows the main correlates of PHU closure are village size ($p = .103$) and remoteness ($p = .044$). This is perhaps not surprising as exactly those PHUs would have come under the greatest pressures because of the epidemic. Other village characteristics such as their poverty, the number of NGOs operating there, or distance from Freetown do not correlate with PHU closures. Panel B confirms policy responses to Ebola were not different in villages with and without PHU closures. Moreover, other infrastructure – such as markets, primary and secondary schools – all functioned similarly during the epidemic.

We then examine how the loss of safe spaces due to PHU closures correlates to outcomes for girls. We do so by estimating the following ANCOVA specification for endline outcome y^1_{ivd} for girl i in village v in district d using only control villages:

$$y^1_{ivd} = \alpha y^0_{ivd} + \beta \rho_{vd} + \gamma X_{ivd} + \upsilon X_{vd} + \lambda_d + u_{ivd}. \quad (1)$$

We condition on the outcome at baseline, y^0_{ivd}, and ρ_{vd} is a dummy equal to one if the village PHU closed during the epidemic. Individual and household controls in X_{ivd} include age dummies, a dummy equal to one if the respondent is illiterate, a household poverty score and household size. Village-level controls in X_{vd} include the number of dwellings, the average household poverty score (constructed from the census), a dummy equal to one if the paramount chief resides in the village, and distances from the closest PHU, market, secondary school, Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (λ_d) and standard errors are clustered by village.[14]

Table 2 shows the results. The first set of outcomes focus on pregnancy. We find that girls in villages exposed to PHU closures during the epidemic are 14.1pp more likely to ever be pregnant between baseline and endline (Column 1) – a 70% increase over the baseline level. Column 2 shows this is largely driven by out-of-wedlock pregnancies: these increase by 10.5pp for girls that lose access to PHUs, corresponding to a 76% increase over the baseline.[15]

Columns 3 to 6 then examine how girls' time use in socializing activities correlates to exposure to PHU closures. We find that among girls losing access to PHUs during the epidemic: (i) at endline they report spending 1.26 more hrs/week with men than girls in villages that maintained access to PHUs, an increase of 39% over the baseline; (ii) they also spend 1.66 hrs/week alone, an increase of 28%; (iii) their time with friends or volunteering/church activities do not differ to girls in villages that retained access to PHUs over the epidemic.

Finally, to highlight the potential link between teen pregnancy and re-enrollment into school post-epidemic, the last two Columns examine how exposure to PHU closures impacts activities at endline. We find that girls without access to PHUs during the epidemic are 20pp less likely to be

[14] Table A2 confirms that attrition between baseline and endline is unconditionally uncorrelated with PHU closure (Column 1) and this remains the case once we also condition on individual and village characteristics (Column 2).

[15] We find no differential shift into marriage between girls with and without access to PHUs during the epidemic.

enrolled in school at endline, and 23.2pp more likely to report being in work. As such, exposure to PHU closures thus correlates to a speeding up the school-to-work transition for girls – in line with pregnant girls being unable to return to school.[16]

We present three additional pieces of evidence to further support the idea that the loss of access to PHUs represents a loss of safe spaces for girls during the epidemic, and this is what drives higher rates of out-of-wedlock pregnancies and speeds up school-to-work transitions for girls.

First, we consider whether PHU closures actually represent a loss of access to contraceptives or advice on reproductive health. Table A2 shows this not to be so. Girls that experience a loss of access to PHUs are no more likely to report ever using a condom at endline, using other contraceptives, and their pregnancy or HIV-related knowledge does not differ.

Second, we examine how the number of social ties correlates to the loss of access to PHUs. This is an important dimension to consider given that an important role of women's groups is to strengthen women's social networks because these can help foster better economic outcomes or offer moral support [Diaz-Martin *et al.* 2022]. We find that girls that experience a loss of access to their PHU report having significantly fewer friends by endline (Column 6): the magnitude of the effect corresponds to a 13% loss of friendship ties relative to baseline. In contrast, ties related to other activities – such as income generation, credit or discussing intimate topics – do not differ by exposure to PHU closures (Columns 7 to 9).

Third, we confirm that at baseline, the same outcomes related to pregnancy, time use, and engagement in school and work activities do not differ pre-epidemic between girls in villages that later experience PHU closures and those that do not (Table A3). This is in line with villages with and without PHU closures being similar on observables (as Table 1 shows) and suggests the results are not picking up differential time trends in outcomes for girls.

2.6 Taking Stock

Tieing together the results, the descriptive picture that emerges from our data is that over the course of the epidemic, rates of teen pregnancy rose by nearly half, with nearly one in five teenage girls becoming pregnant. Post-epidemic, school enrolment rates fell from 72% to 59%, with falls being observed across all ages. These two outcomes are likely linked through school closures: without the protection of time in school during the epidemic, young women might have become more vulnerable to sexual pressures or exploitation. Given school closures occurred nationwide, it is impossible to identify the protective role of schools. However, the non-experimental evidence based on PHUs, that constitute a substitute safe space for young girls, suggests the loss of access to safe spaces can impact the extent of teen pregnancy and re-enrollment into school post-epidemic. To causally study the impacts of safe spaces on girls outcomes, we thus layer onto our analysis

[16] Given increased rates of school-to-work transitions, it might be that girls are exposed to abuse at work. We cannot rule this out altogether, but note that income generating activities for teenage girls typically take the form of solo self-employment.

the randomized introduction of ELA clubs: these serve as a safe space for girls and young women and can thus potentially offset higher pregnancy risks faced during the epidemic.

3 The ELA Intervention

The empowerment and livelihood for adolescents (ELA) intervention aims to kick-start young women's socioeconomic empowerment through the provision of life skills, vocational training and microfinance. The ELA program was designed and implemented by the NGO BRAC in Bangladesh, where low rates of female empowerment are also a major concern. Since 1993, BRAC has established 9,000 ELA clubs worldwide, reaching over a million young women. Based on evaluations in stable economic times, the program has proved to be scalable and cost-effective in other contexts in Sub Saharan Africa [Bandiera *et al.* 2020].

The intervention has two components. The first is the establishment of a physical space for ELA clubs: a fixed (rented) location in each village. ELA clubs have no attendance fee, and are managed by a young woman from the village trained to be the local ELA mentor. This physical space is jointly 'owned' by club members and designed to be open five days a week after school hours, offering a venue for young women to safely gather and socialize away from men. Like PHUs, ELA clubs serve as a safe space for girls and young women. The second component is the programs delivered at ELA clubs: life skills training, vocational training and microfinance. These activities tackle constraints girls face related to reproductive health and skill accumulation.

Randomization The ELA program was randomly assigned to 150 villages, stratified by district, with 50 remaining as controls. The experimental design includes three treatment arms: in T1, ELA clubs only provide life skills training; T2 is as T1 but clubs additionally provide vocational training; T3 is as T2 but clubs additionally provide microfinance. Common to all treatment arms is that ELA clubs provide life skills and a safe space for girls and young women to meet in privacy away from men.[17]

Implementation We use our ELA club mentor survey to evidence the roll-out of ELA clubs during the epidemic. Panel A of Figure A4 provides time series evidence on ELA club openings: (i) 71% opened on time (by September 2014) and by January 2015 all had opened; (ii) the majority

[17] Table A4 shows the life skills modules covered. In treatment arms T2 and T3, vocational courses were organized based on beneficiaries' demand, and covered tailoring, soap making, hairdressing, and tie dying. Clubs provided diversified courses rather than training all participants in one activity. All courses involved a financial literacy module, and upon completion, participants received basic business inputs, e.g. sewing machines were provided to those completing tailoring courses. Each course was offered daily for six hours per day, with courses varying in length depending on the human capital investment required. Eligibility for the livelihood components of the program was designed to be conditional on age: vocational training required beneficiaries to be at least 17 years old. In T3, microfinance loans were up to $100, repayable over a year, with a weekly repayment schedule and a 30% interest rate. The first loan cycle started in April 2015. Microfinance was targeted to those aged 18 and older.

were continuously open through the epidemic. While the safe space offered by ELA clubs was thus always available, the extent to which other intervention components were delivered is more patchy. Panel B shows that in any given month, around 60% of open clubs provided life skills training – and by design, such training is not provided on a daily basis; (ii) vocational training took off after travel quarantines were lifted in January 2015 (these trainings are delivered by professionals, not club mentors).

Balance Table 3 shows village characteristics by treatment and control status. Columns 1 to 3 establish villages are balanced so there was fidelity with randomization protocols even with an unfolding epidemic, even if not all components of the intervention were rolled out on time. The remaining Columns of Table 3 establish that layering on the random assignment of villages to ELA clubs is orthogonal to PHU closures. Among villages with PHUs open during the epidemic, village characteristics are balanced between treatment and controls (Column 4). The same is true among villages that experienced PHU closures (Column 5). Column 6 shows that village characteristics are balanced within treated villages, comparing those with and without PHU closures (so mirroring the balance within control villages shown in Table 1).[18]

Table 4 shows balance on individual characteristics of girls (Columns 1 to 3), within villages that had PHUs open during the epidemic (Column 4), and those that experienced a PHU closure (Columns 5). Column 6 (7) confirms that within control (treated) villages samples are balanced among those with and without PHU closures.

Panel A reports characteristics of girls aged 12-18 at baseline. Respondents are on average 15 years old, with 70% being enrolled in school. Around a third are in a relationship with 8% being married – the average age at marriage is just under 15 with husbands being almost twice as old. These large differences in age at marriage across spouses will be relevant later in the analysis when we study potential spillovers to older cohorts of women from the availability of safe spaces. Despite their teenage years, 20% have children, 13% have children out of wedlock.

Panel B focuses on girls' time use. School and household chores take most of their time: the average girl reports spending between 6 and 7 hours learning per day and devoting a similar amount of time to household chores. Girls report spending 3 hrs/week engaged in sexual activities with men. Panel C details further sexual activity of girls. The majority are sexually active, with the minority using contraceptives. Finally Panel D presents statistics related to violence against girls. For those in relationships, around a third report having experienced some form of intimate partner violence. For girls both in and out of relationships, around 7% of girls report experiencing unwanted sex in the year prior to baseline.

[18] PHUs serve all villages within a few miles of them, so covering populations of 500-5000. As villages in our sample comprise less than 100 households, each PHU serves between five and fifty villages. In line with the evidence in Table 3, the presence of ELA clubs in treated villages are unlikely to have a direct impact on whether PHUs are open or closed.

Attrition We track 83% of teenage girls from baseline to endline (2,783). Among those tracked, 78% (2,181) resided in the same village, while others were typically tracked to a nearby village. Hence, although geographic mobility is high, it does not lead to severe attrition. Appendix Table A1 shows that treatment assignment does not predict attrition (Column 3), and that this remains the case once we also condition on individual and village controls (Column 4). Nor does attrition vary by PHU closure (Column 5).

4 Results

We sequence our results as follows. We first document functioning and participation at ELA clubs. We then evaluate the impact of ELA clubs on pregnancy, time use and school enrolment exploiting only the random assignment of clubs. Third, we consider how the availability of ELA club and PHU safe spaces interact to determine girls' outcomes.

Although the intuition behind the empirical models estimated is straightforward, in the Appendix we show they are also consistent with the implications of a parsimonious model of girls' time allocation between time in school, time at ELA clubs and time spent with men. Unlike in a Becker-style model of fertility, in our context it is more appropriate to model girls as facing pregnancy risk related to the amount of time they spend outside of school or at ELA clubs – and so they are not able to entirely control of the timing of pregnancy. The model is dynamic, and covers time allocation pre-epidemic, during the epidemic when schools are closed, and post-epidemic. The framework takes account of the fact that ELA clubs might offer returns beyond just a safe space, and that a temporary increase in pregnancy risk during the epidemic – say, due to PHU closures – can have persistent impacts on time in school post-epidemic. The model provides a further lens through which to interpret some of the more nuanced results that apply especially in the post-epidemic period when treated girls have access to both ELA clubs and schools.

4.1 Demand for ELA Clubs

Table 5 reports ELA club functioning and participation rates. For completeness, we do so by treatment arm. Information on club functioning is recorded from the ELA mentors survey in June/July 2015. Panel A shows that the supply of clubs was the same across treatment arms. ELA clubs were open on average 8 months by the time of the mentor survey. Information on participation is recorded using endline data. Panel B shows high participation rates at ELA clubs. Around 66% of girls attended ELA clubs. 54% of all girls participated in life skills training (i.e. 82% of club members). In villages where ELA clubs delivered livelihood components (targeted to older girls and young women), 21% of girls attended vocational training and 7% took up a microfinance loan. Importantly, Columns 4 and 5 show that ELA club attendance is not significantly different across treatment arms. This suggests that girls valued time at the clubs above and beyond the

returns from specific activities – the common feature across treatment arms being that ELA clubs serve as safe spaces and provided life skills.

Columns 6 to 8 in Table 5 show how ELA club functioning and demand for them varies with PHU closures. Panel A shows that ELA clubs function to the same extent in villages irrespective of whether those villages also have their PHU closed or open. Panel B shows that attendance to ELA is slightly higher in villages where PHUs closed (76% versus 65%), although the difference is not statistically significant ($p = .178$). However we do observe higher attendance rates at life skills and vocational training courses in ELA clubs where PHUs are closed.

4.2 Protective Impacts of ELA Clubs

We exploit the random assignment of ELA clubs to establish their average impacts at endline on teen pregnancy, time use and school enrolment for girl i in village v in district d. We do so using the following ANCOVA specification:

$$y^1_{ivd} = \alpha_0 + \alpha_1 y^0_{ivd} + \beta_1 T_{vd} + + \gamma X_{ivd} + \upsilon X_{vd} \lambda_d + u_{ivd}, \tag{2}$$

where we control for the baseline outcome (y^0_{ivd}) whenever available. T_{vd} is a dummy equal to one if an ELA club was randomly assigned to village v, and the individual, household and village controls are as in (1). All specifications include district fixed effects (λ_d) and standard errors are clustered by village.

The results are in Table 6. The availability of ELA clubs significantly reduces rates of out-of-wedlock pregnancy by 3.2pp, or 23% of the baseline mean in controls (Column 2). ELA clubs also have pronounced impacts on girls' time use. Girls spend around 3.20hrs/week attending ELA clubs (Column 3) and this mostly comes from substituting away from other forms of social activity. Most importantly, girls in villages with ELA clubs significantly reduce time spent with men by .55hrs/week, corresponding to a 17% reduction over the baseline. They also significantly reduce time spent alone, with friends (outside of ELA clubs), and time spent volunteering/at church. The total time reduction in these activities amounts to 3.27hrs/week, so close to the 3.20hrs/week reallocated to ELA clubs in treated villages.[19]

Finally we note that on average, the presence of ELA clubs does not increase school enrolment at endline. As the model makes precise, this persistent impact of the epidemic will depend both on the substitutability/complementarity of ELA clubs and schools, and the pregnancy risk girls face during the epidemic.

[19]ELA clubs can also crowd out time spent at informal institutions such as secret societies, that exist for men and women in Sierra Leone [MacCormack 1979]. The primary role of these women's societies (known as *Bondo* in the North and *Sande* in the South) is to initiate girls into adulthood through various rituals that have historically included female genital mutilation. Secret societies are often the main source of reproductive health knowledge for young women, which is purposefully withheld from them until initiation.

To drill down further into this, we estimate the heterogeneous impact of ELA clubs as girls' underlying pregnancy risk during the epidemic varies with PHU closures:

$$y^1_{ivd} = \alpha_0 + \alpha_1 y^0_{ivd} + \beta_1 \rho_{vd} + \beta_2 T_{vd} \rho_{vd} + \beta_3 T_{vd}(1 - \rho_{vd}) + \gamma X_{ivd} + \upsilon X_{vd} + \lambda_d + u_{ivd}, \qquad (3)$$

where ρ_{vd} is a dummy equal to one if the village PHU closed during the epidemic, and all other controls are as previously defined.

$\widehat{\beta}_1$ captures the impact of PHU closures in control villages: this should largely replicate what was already shown in Tables 2 and 3. $\widehat{\beta}_2$ captures the impact of ELA clubs in locations where PHUs closed during the epidemic – this is where pregnancy risk is high for girls and ELA clubs provide a *new* safe space that girls can substitute towards. $\widehat{\beta}_3$ captures the impacts of ELA clubs in locations where PHUs remained open – this is where pregnancy risk remains relatively lower for girls (beyond time out of school over the epidemic that is common to all girls), hence where ELA clubs provide an *additional* safe space. In these low-risk treated villages, ELA clubs might substitute for PHUs to the extent that they provide life skills and vocational training that are unavailable in PHUs. As the model developed in the Appendix makes precise, due to these differing channels, the persistent impact of ELA clubs on post-epidemic schooling can differ substantially depending on PHU closures during the epidemic.

The results are in Table 7. Focusing first on pregnancy outcomes, Column 1 shows that in high-risk villages, i.e. where PHUs closed, the availability of ELA clubs reduces pregnancy rates by around half relative to control villages where PHUs also closed. At the foot of Column 1 we report $\widehat{\beta}_1 + \widehat{\beta}_2$ that shows the net increase on the likelihood of ever being pregnant in high-risk villages with ELA clubs is 5.1pp, half the increase in pregnancy of 10.2pp for girls in high-risk control villages. Column 2 shows the protective effects of ELA clubs in high-risk villages are concentrated among out-of-wedlock pregnancies: in high-risk villages, the presence of ELA clubs entirely offsets the increased pregnancy risk girls face: $\widehat{\beta}_1 + \widehat{\beta}_2$ is not different from zero and the 95% confidence interval rules out an impact larger than a 2.4pp increase in out-of-wedlock pregnancies. Finally, $\widehat{\beta}_3$ does not differ from zero for either pregnancy outcome: ELA clubs do not shift pregnancy outcomes in low-risk villages because in those locations girls can still access PHU safe spaces.

Columns 3 to 7 show how ELA clubs in high-risk villages impact girls' time allocation. To begin with we note that Column 3 shows time spent at ELA clubs does not differ across high- and low-risk villages ($p = .833$). However, how this time is reallocated away from socializing activities differs markedly between high- and low-risk villages. In high-risk control villages, the time girls spend with men increases by 1.08hrs/week, but this increase is entirely offset in high-risk treated villages: $\widehat{\beta}_1 + \widehat{\beta}_2$ is not different from zero and the 95% confidence interval rules out an impact larger than a .13hrs/week increase in time spent with men. Similarly, in high-risk villages the amount of time girls spend alone increases by 1.19hrs/week, and this is entirely offset in treated high-risk villages. In low-risk treated villages where girls can access both PHUs and ELA safe

spaces, girls spend significantly less time with men, alone, and otherwise with friends.[20]

The final two outcomes show how these time reallocations translate into activities at endline. In high-risk control villages school enrolment falls by 17.5pp post-epidemic, relative to low-risk control villages. This fall is almost entirely offset in high-risk treated villages: $\widehat{\beta}_1 + \widehat{\beta}_2$ is not different from zero and the 95% confidence interval rules out an impact smaller than a .09pp fall in enrolment post-epidemic. Unlike in high-risk control villages that saw an increased transition from school to work for girls, in high-risk treated villages the protective effects of ELA clubs during the epidemic ensures girls enrol back into school post-epidemic, with no shift into work.

In short, when ELA clubs are available and provide a unique safe space because of PHU closures, teenage girls experience lower rates of pregnancy, enabling more of them to return to school after the epidemic. The provision of safe spaces – either through PHUs or ELA clubs – therefore has important and long-lasting implications for the welfare of teenage girls in a context where young women are vulnerable, and a fragile state is dealing with an aggregate health and economic crisis. The lack of safe spaces that leads to shifts into teen pregnancy, child bearing and school drop-out likely have irreversible impacts on the lifetime welfare of teenage girls and their children [Field and Ambrus 2008, Buchmann *et al.* 2023].

Moreover, treating drop-out in teenage years as an absorbing state, the total lost years of schooling can be substantial. Our data is not best suited to calculate this total loss, but using SLIHS data, Malmendier and Willigrod [2023] show enrolment rates were on a strong upward trajectory pre-Ebola. Examining impacts by age, we find post-epidemic falls in enrolment to be most pronounced among those aged 13 to 17 at baseline, suggesting anything up to five years of lost schooling for some teenage girls. Given estimates of annual private returns to schooling for girls in Sub Saharan Africa of 14% [Filmer *et al.* 2018], this loss of human capital is substantial and entrenches disadvantage for young girls, over any above the effects of teen pregnancy and early childbearing.

4.3 Robustness Checks

In the Appendix we report robustness checks on our central causal chain of core outcomes: out-of-wedlock teen pregnancies, time spent with men, and school enrolment. We first present a sequence of checks to examine whether these results remain unaltered: (i) when using alternative approaches to estimating standard errors; (ii) varying the choice of control variables. Given Table 1 shows that villages where PHUs closed are slightly smaller that those where they remained open, we also show the robustness of our results to narrowing the sample to villages that belong to the

[20] We also examined whether the availability of ELA clubs impacts behavior within relationships. To do so we focus on the subsample of girls that report being in a relationship and examine whether the incidence of intimate partner violence is affected by ELA clubs, PHU closures and their interaction. We find no evidence of changes in violence within relationships. this further reinforces the notion that ELA clubs provide a safe space for girls from men outside of their relationships.

common support of the village size distribution. Our second class of checks address concerns that the impact of ELA clubs is confounded by differential rates of Ebola in treated villages, or by PHU closures proxying for other village shocks that affect outcomes for teenage girls but have nothing to do with the loss of safe spaces – such as when villages are in quarantine and girls might be more exposed to men. Finally, we document how closures of more remote PHUs (where alternative safe spaces might be even more lacking) have more severe impacts on time spent with men.

5 Mechanisms

The results so far point to the key role of ELA clubs in breaking the chain from teen pregnancy to school drop out post-epidemic that otherwise occurred during the Ebola epidemic. ELA clubs fulfill this role in locations where girls faced the highest pregnancy risks. To dig further into mechanisms through which ELA clubs protect teenage girls, we exploit the second stage of randomization, where ELA clubs were assigned alternative bundles of services, corresponding to treatment arms T1, T2 and T3. In T1 ELA clubs only provide life skills training; T2 is as T1 but clubs additionally provide vocational training; T3 is as T2 but clubs additionally provide microfinance.[21]

Life Skills As life skills are part of the bundle in all treatment arms, we cannot experimentally separate out the value of safe spaces from life skills. In Table 8 we therefore present two further sets of results that help separate potential impacts of these two components of ELA clubs.

First, we consider outcomes related directly to the modules covered in the life skills curriculum shown in Table A4, beyond the single module related to teenage pregnancy. Columns 1 to 5 show that the presence of ELA clubs does not change contraceptive use, pregnancy knowledge, knowledge on HIV or sexual activity (Columns 1 to 5). This is true irrespective of the background pregnancy risk to girls during the epidemic.

Second, in high-risk villages, ELA clubs help girls maintain social ties – as a safe space might allow, rather than the life skills component of the intervention. The loss of friendship ties for those in high-risk villages is entirely offset when ELA clubs are available – and girls also form significantly more social ties relevant for income generating activities and credit provision (Columns 6 to 9). The retention of social networks in high-risk treated villages can feedback to our key outcomes if they help foster young women's agency [Diaz-Martin *et al.* 2022], encourage sustained club attendance, and increase the desire to stay in school [Edmonds *et al.* 2023].

Vocational Training or Microfinance We next use the experimental design to establish whether over and above the safe space and life skills component embedded within T1, the ad-

[21] Gulesci *et al.* [2021] find that a female empowerment intervention delivered in Bolivia during Covid-19, providing life skills, mentoring and job finding assistance reduced violence against women. The main mechanisms through which the treatment was mediated is increased earnings of women (that could then improve their bargaining position within relationships), and spending more time out of the home through increased labor supply.

ditional provision of vocational training and microfinance drive the documented effects of ELA clubs. These additional activities can potentially increase the value of time spent at ELA clubs and thus further displace other activities, such as time spent with men, and so help strengthen the causal chain linking teen pregnancy and school drop out post-epidemic.

To examine whether intervention components differentially impact outcomes for girls, we extend the specification in (2) to consider the impacts of treatment arm $j = 1, 2, 3$ as follows:

$$y^1_{ivd} = \alpha_0 + \alpha_1 y^0_{ivd} + \sum\nolimits_j \beta_{1j} T_{vd} + \gamma X_{ivd} + \upsilon X_{vd} \lambda_d + u_{ivd}, \tag{4}$$

where T^j_{vd} is set equal to one if village v in district d receives ELA club intervention j, and all other controls are as previously defined.

Table 9 shows the results: for each treatment arm these are largely in line with the earlier findings when we pooled all treatment arms. At endline, pregnancies, time spent at ELA clubs, time spent with men and in other socializing activities, school enrolment and transitions to work, do not significantly differ with the bundle of inputs provided at ELA clubs. This is confirmed by the p-values reported at the foot of each column on the equality of ITT effects between T1 and T2, and between T1 and T3.

Most notably, time spent at ELA clubs is the same across treatment arms suggesting the value of club attendance is not strongly related to the provision of vocational training or microfinance over and above the provision of a safe space and life skills. The earlier finding that ELA participation rates were higher in villages that experienced PHU closures (Table 5) is thus more in line with girls attending ELA clubs as a safe space rather than because of these activities *per se*.[22]

To build on this argument we extend (3) to consider the heterogeneous impacts of ELA treatment arm $j = 1, 2, 3$ across different pregnancy risk that girls face during the epidemic due to the availability of PHU safe spaces:

$$y^1_{ivd} = \alpha_0 + \alpha_1 y^0_{ivd} + \beta_1 \rho_{vd} + \sum\nolimits_j \beta_{2j} T^j_{vd} \rho_{vd} + \sum\nolimits_j \beta_{3j} T^j_{vd} (1 - \rho_{vd}) + \gamma X_{ivd} + \upsilon X_{vd} + \lambda_d + u_{ivd}. \tag{5}$$

The results are summarized in Figures 4A to 4C. These show the heterogeneous treatment effects for out-of-wedlock teen pregnancies, time spent with men, and school enrolment respectively. Each Figure reports three estimates: (i) $\widehat{\beta}_1$, the partial correlation with PHU closures in controls; (ii) $\widehat{\beta}_{2j}$, the ITT estimate of ELA clubs in treatment arm j in villages where the PHU closed, and in the lighter dashed bar we show $\widehat{\beta}_1 + \widehat{\beta}_{2j}$, namely the net impact on outcomes in high-risk treated villages from treatment arm j; (iii) $\widehat{\beta}_{3j}$, the ITT impact of ELA clubs in treatment arm j in villages where PHUs remained open and can also act as a safe space.

Across all three outcomes, the treatment effects of ELA clubs in high-risk villages do not

[22] The results in Table A9 further confirm no impacts in any treatment arm on outcomes associated with the life skills component of the intervention.

significantly differ across treatment arms (middle panels). Moreover, the treatment effects of ELA clubs in low-risk villages also do not significantly differ across treatment arms (right hand panels). Finally, the *net* effect of ELA clubs in high-risk villages is very similar to their effect in low-risk villages, namely we cannot reject the null that $\widehat{\beta}_1 + \widehat{\beta}_{2j} = \widehat{\beta}_{3j}$ in each arm j as shown by the nine p-values reported across the panels.

Overall, these results are consistent with the provision of a safe space through ELA clubs being sufficient to prevent kick-starting a causal chain between teen pregnancy, time spent with men and school dropout; and that these impacts are much more pronounced for girls losing access to PHU safe spaces during the crisis. Our results echo the concerns of the international community [Amnesty International 2015]: teen pregnancies represent one of the key channels through which the crisis permanently shifted young women's socioeconomic trajectories. This increase in fertility is concentrated among young women who found themselves isolated by the closure of both schools and other safe spaces. However, the random allocation of ELA club safe spaces to villages is entirely sufficient to break this causal chain.

6 Discussion

Adolescent girls face severe disadvantages across the developing world stemming from limited agency over their bodies and barriers to investing in their human capital. We study how these outcomes are impacted in times of aggregate crisis, in the context of the 2014-6 Ebola epidemic in Sierra Leone. Our study is based around an evaluation of a club-based intervention targeting young women that was implemented during the epidemic. The intervention provided them a protective safe space where they can spend time away from men. Due to the epidemic, schools were closed throughout 2014/5. We show that without the protection of time in school, in control villages, young girls spent significantly more time with men, teen pregnancies rose sharply, and school enrolment dropped post-epidemic, long after schools had re-opened, with these effects being even more pronounced for girls that lost access to other available safe spaces during the epidemic.

The combination of experimental and non-experimental we provide together shows that the provision of safe spaces – either via ELA clubs or PHUs – breaks this causal chain: it enables girls to allocate time away from men, reduces out-of-wedlock pregnancies, and increases their school re-enrolment rates post-epidemic. The effects of ELA club safe spaces are most more pronounced where girls lose access to other available PHU safe spaces during the epidemic. To pin down mechanisms, we show other outcomes associated with the life skills component of the intervention do not shift, and exploit the second layer of randomization of the input bundle offered by clubs. This reinforces the idea that the safe space component offered by clubs is critical to driving outcomes for teenage girls, rather than the vocational training or micorfinance components. Our analysis has important implications for school closures in response to the aggregate health crisis

in contexts where young women face sexual violence, highlighting the protective and lasting role safe spaces can provide in such times.

We conclude by discussing three further issues. First, we consider the distributional consequences of school closures during the epidemic and how ELA clubs impacted them. Second, given that future epidemics and pandemics are almost inevitable, we outline a future research agenda on gender inequality and aggregate crisis, building on the body of related work produced on the Covid-19 pandemic. Finally, we discuss how our work fits into the wider literature emphasizing the benefits of club-based interventions.

6.1 Spillovers to Older Girls and Young Women

Our analysis already highlights some important distributional consequences of the epidemic. Without the protection of time in school during the epidemic, girls that additionally lost access to PHU safe spaces faced a far higher pregnancy risk, resulting in lower school re-enrollment post-epidemic and faster school-to-work transitions. As a result, the protective effects of ELA clubs are highest for girls for whom they represent the only available safe space during the epidemic.

However, a second important distributional concern arises across age cohorts, in the comparison between teenage girls and older women. If ELA clubs offer protection to teenage girls, there is potential for any unwanted focus of men shifting towards older women (even if older women are not directly impacted by school closures). This exposure can arise from: (i) younger boys that are no longer in school during the epidemic because of school closures; (ii) from the existing partners of young women, who absent the epidemic, might have been also engaging in sexual activity with teenage girls. This second channel was already highlighted in Table 4 where we noted the large differences in spousal ages at marriage.

As girls and women aged 12 to 25 are all eligible to participate in ELA club activities, we surveyed across this age range at baseline and endline and so can examine the spillover issue using data collected from women aged 19 to 25 from the same villages. At baseline, 57% of this cohort are married and so we first focus on examining effects among those unmarried at baseline.[23]

Table 10 shows the results. To begin with, we see that older women spend just under 3hrs/week at ELA clubs, in line with the results for teenage girls (Column 1). Time spent at ELA clubs does not differ with pregnancy risk faced by younger girls as embodied in PHU closures ($p = .280$). We still find some suggestion of a protective effect of ELA clubs in high risk villages. In high-risk control villages, the time women spend with men increases by 1.61hrs/week, but this increase is offset in high-risk treated villages: $\widehat{\beta}_1 + \widehat{\beta}_2$ is not different from zero and the 95% confidence interval rules out an impact larger than a .99hrs/week increase in time spent with men.

[23] Attrition rates among this older sample to endline are similar as for teenage girls: 84% of them are tracked to endline. Among this sample we also find that treatment assignment does not predict attrition, nor does attrition vary by PHU closure or the interaction between assignment of ELA clubs and PHU closures.

We next see that reassuringly there is no rise in out-of-wedlock pregnancies for older women (Column 3), nor does varying availability of safe spaces from ELA clubs and PHUs relate to them being in some (unmarried) relationship (Column 4). The availability of ELA clubs in high-risk villages however substantially slows down entry into marriage for older women who are unmarried at baseline (Column 5). The effect in high-risk treated villages is significantly different from that in low-risk treated villages ($p = .046$).[24]

Given most of these women are in some relationships at baseline (even if unmarried), the next batch of Columns examine behavior within relationships. Here we see that in control villages, when PHUs close and teenage girls are less protected from men, relationships for older women are less violent, there is less transactional sex and less unwanted sex (Columns 6 to 8). On each dimension, the magnitude of change is large and close to the baseline mean in controls: namely in the presence of PHU closures, older women in control villages experience almost no violence, transactional sex or unwanted sex in their relationships at endline. This shift in behavior within relationships is consistent with their older partners redirecting attention to teenage girls in those villages where girls entirely lack safe spaces. Finally, in treated low-risk villages where teenage girls have access to both PHU and ELA clubs as safe spaces, we find an increase in violence within relationships for older women of 9.3pp, or 31% of the baseline mean.[25]

A body of evidence shows that across crisis contexts, engagement in transactional sex by older women can represent a form of income generation when economic opportunities are curtailed and other coping mechanisms to smooth consumption are unavailable [Bullough and Bullough 1987, Allen 2004, Dupas and Robinson 2012]. Our results suggest the use of transactional sex among older women in the Ebola epidemic depends on the availability of safe spaces for teenage girls: the impact of ELA clubs on transactional sex depends differentially on whether teenage girls have PHU safe spaces available to them. When they do, the incidence of transactional sex is significantly higher ($p = .043$).

Finally, we repeat the analysis for older women that were already married at baseline. This is shown in Table A10. Among those married, we find they also spend similar time at ELA clubs (Column 1), but with less pronounced changes in time spent with men (Column 2). Importantly, in terms of their relationships, we find no evidence of changes in violence, transactional sex or unwanted sex, that vary with the availability of safe spaces for young girls in the same village (Columns 4 to 6).

Our results thus suggest an interlinkage in outcomes across teenage girls and marginal older women – those unmarried at baseline. These distributional effects of ELA clubs create complica-

[24] As Buchmann *et al.* [2023] note, there is growing evidence that early marriage is bad for women and their children – women who marry as adolescents attain less schooling and give birth at a younger age, both of which result in worse outcomes for their children [Field and Ambrus 2008, Chari *et al.* 2017].

[25] When asking about transactional sex, we mention multiple forms of in-kind gifts that might be provided by partners, including help with school fees. This has long been argued to be part of transactional sexual arrangements in place for younger girls in this context [Bledsoe 1990].

tions for welfare analysis from the provision of safe spaces, because the protective gains to teenage girls come partly at the expense of worsening relationships for unmarried older women (but no changes for already married women).

6.2 Agenda

Covid-19 and Future Epidemics Viruses continue to shape human history. Between 1980 and 2013, there were over 12,000 recorded outbreaks of 215 human infectious diseases, comprising 44 million cases across 219 countries, with the frequency and diversity of viral outbreaks increasing over time [Smith *et al.* 2014]. The underlying drivers of more recurrent outbreaks have been an increase in the connectivity of human populations, closer contact between human and animal species, mass displacements arising from conflict, and climate change. None of these drivers are likely to dissipate, so it remains vital to understand how to protect the most vulnerable in societies facing challenges from aggregate health and economic shocks.

Covid-19 of course brought these issues to the fore. One of the major lessons from the pandemic, across high- and low-income settings, was the gendered nature of impacts, stemming from lockdowns and school closures because: (i) women's labour force participation was more affected because the sectors they engage in are more sensitive to social distancing [Alon *et al.* 2022]; (ii) the unequal distribution of housework and care duties [Adams-Prassl *et al.* 2020, Andrew *et al.* 2022]; (iii) an increase in intimate partner violence against women [Boserup *et al.* 2020, Leslie and Wilson 2020, Ravindran and Shah 2020].

More directly in line with our analysis in the context of the Ebola epidemic, during Covid-19 it became widely recognized that school closures again put millions of girls across low-income countries at risk of pregnancy and early marriage [UNICEF 2021]. Our evidence highlights that an important lesson for the future is that stigmatization and discrimination against pregnant girls remain a pervasive barrier to girls resuming education post-lockdowns throughout Sub-Saharan Africa. Countries such as Uganda and Tanzania have such explicit restrictions in place, while others retain ambiguous policy statements on the issue [Birungi 2015]. It is therefore hugely significant that as Sierra Leone in 2020 was struck by Covid-19, the government announced it would overturn the law barring pregnant girls from going to school. Our results show the importance of other countries following suit, and more broadly, for future studies to better understand the dynamics across these aggregate health crisis for young women.[26]

Club-based Interventions Our work adds to a growing evidence base using club-based interventions to foster young women's socioeconomic empowerment. Diaz-Martin *et al.* [2022] provide

[26]The government of Sierra Leone had originally been challenged over the policy in a legal case brought to the Economic Community of West African States' Community Court of Justice: in December 2019 they ruled that the ban should be revoked. The case challenging the ban was brought by Sierra Leonean NGO (WAVES) in partnership with Equality Now and the Institute for Human Rights and Development in Africa.

a thorough review of this evidence, and highlight two key advantages of group-based intervention delivery relative to targeting individuals. First, clubs serve as a platform for intervention delivery at-scale. Second, interactions among club members can be a strong mechanism through which intervention impacts are enhanced – say because fostering social ties can provide information, material and moral support to targeted beneficiaries.[27]

While much of this work establishes the benefits of club-based interventions in periods of economic stability, we show in times of crisis, such interventions have an additional benefit that generates persistent improvements in well-being: they provide a safe space that protects women from teen pregnancy and early childbearing, reducing school-to-work transitions and thus fostering their long run human development. This is an important insight because low-income countries remain more susceptible to aggregate shocks to begin with, and gender inequalities are more pronounced in poorer settings. Simple but powerful safe space interventions might then do much to prevent hard-earned gains to female empowerment being quickly eroded in such contexts in times of crisis, ultimately enabling societies hit by aggregate shocks to recover more quickly from them, rather than aggregate but temporary shocks casting a long shadow over the future lives of young women.

A Appendix

A.1 Framework

A.1.1 Set Up

We develop a parsimonious model of girls' time allocation, where they choose between time in school, time at ELA clubs and time spent with men. The framework makes precise how these time allocations vary with the underlying pregnancy risk that girls are exposed too, and how a temporary increase in pregnancy risk due to the loss of safe spaces during the epidemic, can have persistent impacts on school enrolment post-epidemic. The model implications map to the structure of estimating equations used in our core analysis.

We use a three period model to map to our data collection: (i) $t = 0$ is the baseline pre-epidemic period; (ii) $t = 1$ is when the Ebola epidemic occurs, with school closures in place; (iii) $t = 2$ is the endline period after schools reopen. Each period t, girls allocate their time between schooling s_t, a safe space such as ELA clubs c_t, and socializing l_t that includes time spent with

[27] Examples of contributions in this group-based literature include evaluations of conditional cash transfers [Baird *et al.* 2011], school subsidies [Duflo *et al.* 2015], microfinance [Feigenberg *et al.* 2013], the provision of negotiation skills [Ashraf *et al.* 2020], school-based training on life skills [Edmonds *et al.* 2023] and gender equality training [Dhar *et al.* 2022].

men. Preferences are described by a CES utility function:

$$u(s, c, l) = \left[\alpha_s s^\eta + \alpha_c c^\eta + \alpha_l l^\eta\right]^{1/\eta}, \tag{6}$$

where taste parameters are such that $\alpha_s + \alpha_c + \alpha_l = 1$ and the elasticity of substitution between time uses is $\sigma = 1/(1-\eta)$. The taste for schooling parameter α_s captures (in reduced form) both the contemporaneous utility from attending school and the expected returns to schooling on future wages. Likewise, α_c captures the contemporaneous utility from attending ELA safe spaces, and the expected future returns from doing so – say through the acquisition of life skills, vocational training or microfinance.

The state variable $z_t \in \{0, 1\}$ captures a girl's motherhood status with $z_t = 1$ indicating she starts period t having had a child. We focus on girls who have no children at baseline, assume girls are not pregnant at $t = 0$ ($z_0 = 0$), and have a time endowment scaled to unity: $s_0 + c_0 + l_0 = 1$. At the end of each period a girl can become pregnant. As time spent socializing includes time with men, each unit of l_t can result in a pregnancy at the end of the period with probability $\pi \in [0, 1]$:

$$\mathbb{P}[z_{t+1} = 1 | l_t, z_t = 0] = \pi l_t. \tag{7}$$

π thus captures pregnancy risk that girls face, that depends in part on the availability of safe spaces. We model pregnancy, $z_t = 1$, as an absorbing state:

$$\mathbb{P}[z_{t+1} = 1 | l_t, z_t = 1] = 1,$$

Hence being pregnant and having a child represent the same state, and we do not model having multiple children. Having a child entails a time cost $\psi \in [0, 1]$.[28]

Girls thus face an intertemporal trade-off between the utility of socializing today and the risk of getting pregnant and hence facing a more binding time constraint next period. Given fertility status z_t, the time constraint can be rewritten as: $s_t + c_t + l_t = 1 - \psi z_t$.

[28] The time endowment is net of household chores, which we assume to behave as an exogenous lump-sum tax on young women's total time. In our data, the average respondent who is single and has no children reports spending 40 hours/week on household chores. Over the cross-section, this rises by 18 hours when the first child is born, and does not change significantly when a second or third children are born. This is in line with our modelling assumption of $z_t = 1$ being an absorbing state, and not needing to track the actual number of children in terms of time cost incurred.

A.1.2 Pre-epidemic

At baseline pre-epidemic, both the future Ebola epidemic and availability of ELA clubs are unknown. Thus $c_t = 0 \; \forall \; t$ and the time allocation problem across periods is:

$$\begin{aligned} V_t(z_t) &= \max_{s_t, l_t} u(s_t, 0, l_t) + \beta \mathbb{E}_z[V_{t+1}(z_{t+1})] \text{ for } t = 0, 1 \\ V_2(z_2) &= \max_{s_2, l_2} u(s_2, 0, l_2) \end{aligned} \tag{8}$$

subject to $s_t + l_t = 1 - \psi z_t$, $s_t, l_t \in [0, 1]$ and (7). The FOCs at $t = 0$ and 1 make clear that girls face an intertemporal trade-off:

$$\frac{\partial u}{\partial s_t} + \beta \pi [V_{t+1}(0) - V_{t+1}(1)] = \frac{\partial u}{\partial l_t}, \; t = 0, 1. \tag{9}$$

The marginal benefit to schooling today is the flow utility of schooling (first term on the LHS) as well as the effect that time in school has on the likelihood of pregnancy, which determines the time constraint tomorrow. At the optimum the sum of the two equals the marginal utility of leisure (RHS). The time allocated to schooling and socializing is summarized by policy functions for $z_t = 0, 1$ with the following characteristics:

$$\begin{aligned} &s_0^*(0) > s_1^*(0) > s_2^*(0) = \omega_s, \quad l_0^*(0) < l_1^*(0) < l_2^*(0) = \omega_l \\ &s_t(1) = \omega_s(1 - \psi) \qquad\qquad\quad l_t(1) = \omega_l(1 - \psi). \end{aligned} \tag{10}$$

A.1.3 During the Epidemic

School closures during the epidemic imply $s_1 = 0$. As the epidemic is unexpected at time $t = 0$, choices are the same as above, but at $t = 1$, school closures reduce the opportunity cost of spending time with men. Choices at $t = 2$ will then be constrained by fertility outcomes at $t = 1$, as in the FOCs above. Higher pregnancy risk π during the epidemic makes the time constraint post-epidemic more binding in expectation, thus decreasing average time in school post-epidemic at $t = 2$. This is the mechanism through which temporary school closures can have permanent effects on time in school. During the epidemic, in our study context, PHU closures proxy an increase in pregnancy risk π.[29]

With $T \in \{0, 1\}$ representing treatment assignment, the constraint $c_t \in [0, T]$ captures the availability of ELA clubs. A girl's time allocation problem during and post-epidemic can thus be

[29] We choose to model health centres' availability/closure as a shifting in pregnancy risk π to simplify exposition. While we could have modeled time spent at PHUs as an extra dimension of girls' time allocation, this would lead to a more cumbersome model and retain qualitatively identical predictions.

rewritten as:

$$V_1(0) = \max_{c_1, l_1} u(0, c_1, l_1) + \beta \mathbb{E}_z[V_2(z_2)] \tag{11}$$
$$V_2(z_2) = \max_{s_2, c_2, l_2} u(s_2, c_2, l_2)$$

subject to: (i) $c_1 + l_1 = 1$; (ii) $s_2 + c_2 + l_2 = 1 - \psi z_2$; (iii) $s_2, l_1, l_2 \in [0, 1]$; $c_1, c_2 \in [0, T]$. Demand for ELA clubs is driven both by the direct utility of attendance and future returns from attendance. In addition, ELA club attendance displaces time spent with men, thus reducing the likelihood of pregnancy. The epidemic strengthens this last motive: with schools closed, ELA clubs are a safe space available to girls, and are therefore crucial for avoiding pregnancies and returning to school post-epidemic. The FOC for the time spent in ELA clubs during the epidemic makes this clear:

$$\frac{\partial u}{\partial c_1} + \beta\pi[V_2(0) - V_2(1)] = \frac{\partial u}{\partial l_1}, \tag{12}$$

where the first term is the standard demand for ELA clubs, which is increasing in α_c, and the second term is the future value of not getting pregnant today, i.e. the value of the safe space, that appears also in (9). This value is increasing in pregnancy risk π and, under some straightforward conditions on preferences, is also increasing in the returns to schooling α_s.[30]

A.1.4 Post-epidemic

Time allocations in the final period $t = 2$ have no intertemporal implications, and so choices are determined by the FOC setting the marginal rate of substitution between schooling and socializing equal to the shadow cost of time. Time allocated to school and socializing are then just shares of the total time available at $t = 2$:

$$s_2^*(z_2) = \omega_s(1 - \psi z_2) \tag{13}$$
$$l_2^*(z_2) = \omega_l(1 - \psi z_2),$$

where the shares are functions of the underlying taste parameters: $\omega_s = \frac{{\alpha_s}^\sigma}{{\alpha_s}^\sigma + {\alpha_l}^\sigma}$, $\omega_l = 1 - \omega_s$.

To understand the effect of the epidemic on time in schooling we start from expected demands

[30] Note that $V_2(0) - V_2(1) = \psi V_2(0)$. Using the envelope theorem it can be shown that this quantity is increasing in α_s if and only if $\frac{1}{\eta}\left[\omega_s^\eta + \frac{d\alpha_c}{d\alpha_s}\omega_c^\eta + \frac{d\alpha_l}{d\alpha_s}\omega_l^\eta\right] > 0$, where $d\alpha_s + d\alpha_c + d\alpha_l = 0$ since the preference parameters sum to one. In our setting, the share of time devoted to schooling ω_s is the largest among the three activities, and we assume an elasticity of substitution greater or equal than one, i.e. $\eta \in [0, 1]$. Therefore, if the taste for schooling is the only parameter that increases - both $d\alpha_c$ and $d\alpha_l$ are non-positive. This is sufficient for the above condition to be satisfied.

in period $t = 2$ across treatment and control villages:

$$\begin{aligned} \text{Treatment:} \quad & S_2^T = \mathbb{E}_z[s_2^*(z_2)|T=1] = \omega_s^T(1 - \pi\psi(1 - C_1^T)) \\ \text{Control:} \quad & S_2^C = \mathbb{E}_z[s_2^*(z_2)|T=0] = \omega_s(1 - \pi\psi), \end{aligned} \tag{14}$$

where expectations are taken over the distribution of the state variable. Denote $\omega_s = \frac{\alpha_s^\sigma}{\alpha_s^\sigma + \alpha_l^\sigma} \geq \omega_s^T = \frac{\alpha_s^\sigma}{\alpha_s^\sigma + \alpha_c^\sigma + \alpha_l^\sigma}$, and $\pi\psi$ is the expected cost of pregnancy risk.

In control villages the epidemic leaves girls without access to school or ELA clubs. As a result, a share π of girls in control villages become pregnant, bearing the time cost ψ and limiting time available for schooling post-epidemic. The number of girls becoming pregnant, and the resulting fall in enrolment post-epidemic, are proportional to pregnancy risk, so varying with PHU closures.

In treated villages, ELA clubs are available both during and after the epidemic. The treatment effect on time in school once they reopen post-epidemic is:

$$TE = S_2^T - S_2^C = -(1 - \pi\psi)(\omega_s - \omega_s^T) + \pi\psi C_1^T \omega_s^T.$$

The first term is the *contemporaneous* channel, where the share of time allocated to school falls because clubs might substitute for time in school ($\alpha_c > 0$). The second term is the *intertemporal* channel where the use of safe spaces during the epidemic (C_1^T) reduces the likelihood of becoming pregnant, relaxing the post-epidemic time constraint and so increasing time in school post-epidemic ($\alpha_s > 0$). These move the treatment effect on post-epidemic schooling in opposite directions and can help explain the overall null impact of ELA clubs on school enrolment found in Table 6.[31]

Pregnancy risk π matters for time in school in both treatment and control villages, but to different extents. If the epidemic differentially shocks the degree of pregnancy risk girls face (because of PHU closures), we have that:

$$\frac{dTE}{d\pi} = \psi\omega_s^T \left(C_1^T + \pi \frac{\partial C_1^T}{\partial \pi} \right) + \psi(\omega_s - \omega_s^T) \geq 0. \tag{15}$$

Hence the treatment effect on schooling increases in pregnancy risk π (we see this from the FOC and the fact that C_1^T is increasing in π). Therefore, while the sign of treatment effects of ELA clubs on time in school is *a priori* ambiguous, it increases with pregnancy risk – as proxied by PHU closures. This is exactly what is mapped to the data using specification (3).

[31] The treatment effect can be signed in extreme cases of $\pi\psi = 0$ or 1. If either there is no risk of pregnancy ($\pi = 0$) or no time cost associated with having children ($\psi = 0$). Then $TE = -(\omega_s - \omega_s^T) < 0$, as clubs only act as a substitute for schooling. In the other extreme case of $\pi\psi = 1$ the treatment effect is unambiguously positive as $TE = C_1^T \omega_s^T > 0$.

A.2 Robustness Checks

Specification Checks We first examine the robustness of our results related to out-of-wedlock teen pregnancies, time spent with men, and school enrolment to various specification checks. Table A5 shows how in control villages, the precision of the partial correlation between PHU closures and our outcomes of interest varies with alternative approaches to estimating standard errors in (1). Our baseline choice of clustering standard errors at the unit of randomization tends to deliver the most conservative confidence intervals. Table A6 repeats the analysis when we layer on the randomization of ELA clubs and so estimate (3). Our results remain robust to these approaches, and the Table also shows robustness to randomization-t exact inference [Young 2019].

Columns 1 to 6 in Table A7 shows the findings from (1) and (3) are not driven by the choice of control variables: if we drop all covariates, the point estimates for each outcome remain very similar, in line with PHU closures being uncorrelated to village characteristics, and the random assignment of ELA clubs to villages. As discussed in relation to Table 1, it is the case however that villages where PHUs closed are slightly smaller that those where they remained open. In particular, the subsample of villages that did not experience PHU disruptions includes outliers on both tails of the village size distribution. To check our results are not driven by these outliers, Columns 7 to 9 show that our core findings are robust to limiting the sample of treatment and control villages to those that belong to the common support of the village size distribution, with the point estimates and their precision being close to those from our main specification.

Confounders Our second class of checks address concerns that the impact of ELA clubs is confounded by other features of the Ebola epidemic, unrelated to the loss of safe spaces for teenage girls. First, it might be that any benefits of ELA clubs are offset by a higher rate of contagion. While clubs were required to enforce social distancing rules and follow government guidelines to minimize the possibility of contagion, whether this occurred in practice is hard to assess. To provide evidence on the matter, Columns 10 to 13 in Table A7 examine impacts on reported cases of Ebola, using (1) and (3). We elicited information about whether any Ebola cases had occurred in the household or extended family network. We do not find any evidence that in villages where PHU closures occurred, there were higher rates of Ebola. Nor do we find evidence that the presence of ELA clubs impacted reported Ebola cases.

Other Shocks A concern is that PHU closures proxy for concurrent shocks during the epidemic that affected young women's outcomes, but are unrelated to the loss of safe spaces. To examine the issue we estimate (3) but consider other epidemic-related village shocks, rather than PHU closures: (i) whether the local secondary school was delayed in reopening; (ii) whether the local market closed during the epidemic; (iii) whether the village needed to be quarantined during the epidemic. Figure A5 summarizes the results, where as a point of comparison, the first row

of estimates are those for PHU closures. For no other type of village event do the results for pregnancy, time with men and school enrolment replicate those for PHU closures. More precisely, we find that: (i) in control villages, out-of-wedlock pregnancy, time spent with men and school enrolment are not impacted by any of the other village events considered; (ii) in treated villages experiencing these other events, time spent with men and school enrolment are not impacted; (iii) in treated villages that do not experience these other events, time spent with men falls in the presence of ELA clubs, but out-of-wedlock pregnancy and school enrolment are unaffected. We reiterate that these null effects also apply for village quarantines. When villages are in lockdown it might have been the case that girls are more exposed to abuse from men. In contrast, we find no direct effect of village quarantines on teen pregnancies, time with men or school enrolment. The results further point to the effect of safe spaces – PHUs and ELA clubs – as being critical for outcomes among teenage girls in the epidemic.

Remoteness We check how the results vary with the remoteness of villages – the closure of more remote PHUs might matter if alternative safe spaces are even more lacking in such locations. We measure remoteness using miles from the district capital via road. The results are in Table A8, where we extend specification (3) to allow for the effects of PHUs and ELA clubs to vary with the remoteness of the village. We see that remoteness does not correlate with pregnancy, time use or school enrolment, although girls in more remote locations are less likely to work. The impacts of PHU closures are more severe in remoter locations – girls spend significantly more time with men when PHUs close in more remote locations. The impacts of ELA clubs on pregnancy outcomes, time spent with men, school enrolment and work do not vary with the remoteness of villages.

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Table 1: Village Characteristics, by PHU Closure

Sample: Control villages only
Means, standard deviations in parentheses
P-value of t-test of equality of means in braces

	Peripheral Health Unit Open	Peripheral Health Unit Closed	Difference p-value
	(1)	(2)	(3)
Number of Villages	43	7	
A. Village Characteristics			
Number households (census)	94.0	71.1	{.103}
	(77.0)	(27.9)	
PPI Score, average (census)	38.0	40.3	{.578}
	(6.01)	(4.03)	
Distances (in miles) from:			
Peripheral Health Unit	1.58	2.86	{.044}
	(1.44)	(2.21)	
Secondary school	3.73	2.29	{.175}
	(3.53)	(1.41)	
Market	8.26	10.5	{.712}
	(5.85)	(8.89)	
Freetown	56.5	29.9	{.580}
	(25.8)	(3.52)	
Kahilaun	75.4	96.9	{.621}
	(19.4)	(7.30)	
B. Policy Responses			
Village was quarantined	.047	.143	{.306}
Village visited by contact tracing team	.953	1.00	{1.00}
Received relief from NGO	.791	.714	{.488}
Day market ever closed	.370	.333	{.377}
Primary school re-opened on time	.767	.571	{1.00}
Secondary school re-opened on time	.791	.571	{1.00}

Notes: Sample restricted to control villages. Data on village size and wealth collected through a census of study villages carried out in 2013. Household wealth measured via the Progress out of Poverty Index (PPI). Distance form Freetown and Kahilaun are computed using GPS data. Data on the location and functioning of Peripheral Health Units (PHU) serving each village, and other services such as markets and schools, were collected through a survey of village leaders in October 2015. A PHU is considered closed if it did not operate for at least one month between July 2014 and September 2015. All distances are measured in miles. Column 3 reports p-values from a test of equality of means carried out by OLS regression of each village characteristic on a dummy for PHU closure. Regressions include strata (district) fixed effects and robust standard errors.

Table 2: PHU Closures, Pregnancy, Time Use and School Enrolment

Sample: Control villages only

Outcomes measured post-epidemic (2016)

ANCOVA estimates, standard errors in parentheses

	Pregnancy		Time Use Socializing (hours/week)				Activities	
	Ever pregnant	Pregnant out of wedlock	Men	Alone	Friends	Volunteer/ Church	Enrolled in School	Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PHU closed	.141***	.105**	1.26***	1.66***	.650	.212	-.201***	.232***
	(.031)	(.040)	(.449)	(.436)	(.467)	(.681)	(.052)	(.051)
Control mean at baseline	.201	.138	3.27	6.01	6.26	10.7	.724	.430
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	696	696	696	696	696	696	696	696

Outcomes: All pregnancy outcomes in this table refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "Income Generating Activities (IGA)", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". "Friends" refers to socializing taking place outside of the ELA club. The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Column 7 captures school enrolment and Column 8 captures engagement in any income generating activity - whether self-employment or wage work, occasional or stable, paid or unpaid. The two outcomes are not mutually exclusive.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the village.

Table 3: Village Characteristics, Balance by Treatment Assignment

Means, standard deviations in parenthesis
P-value of t-test of equality of means in braces

	All Villages			PHU Open	PHU Closed	Treated Villages
	Control	Treatment	T = C p-value	T = C p-value	T = C p-value	PHU Open = PHU Closed p-value
	(1)	(2)	(3)	(4)	(5)	(6)
Number of Villages	50	150		172	28	150
A. Baseline Balance on Village Characteristics						
Number households (census)	90.82	84.6	{.564}	{.420}	{.197}	{.515}
	(72.4)	(45.5)				
PPI Score, average (census)	38.3	37.5	{.400}	{.432}	{.946}	{.341}
	(5.80)	(5.42)				
Distances (in miles) from:						
Peripheral Health Unit	1.76	1.85	{.725}	{.497}	{.529}	{.173}
	(1.60)	(1.72)				
Secondary school	3.53	4.23	{.258}	{.251}	{.905}	{.452}
	(3.34)	(5.10)				
Market	8.57	11.3	{.017}	{.030}	{.348}	{.921}
	(6.30)	(9.02)				
Freetown	52.8	52.6	{.291}	{.239}	{.404}	{.508}
	(25.7)	(24.2)				
Kahilaun	78.4	78.6	{.248}	{.242}	{.923}	{.755}
	(19.6)	(18.5)				
B. Village Leader Survey						
"Girls who are visibly pregnant have a bad influence on their non-pregnant peers" [=1 if strongly agree]	.960	.967	{.873}	{.670}	{.356}	{.463}
"Girls should be allowed to continue their education while pregnant" [=1 if strongly agree]	.120	.073	{.365}	{.579}	{.312}	{.019}
C. Policy Responses						
Village was quarantined	.060	.040	{.595}	{.513}	{.954}	{.133}
Village visited by contact tracing team	.960	.933	{.455}	{.437}	{1.000}	{.174}
Received relief from NGO	.780	.873	{.139}	{.308}	{.238}	{.792}
Day market ever closed	.364	.219	{.118}	{.243}	{.289}	{.636}
Primary school re-opened on time	.740	.813	{.263}	{.493}	{.238}	{.992}
Secondary school re-opened on time	.760	.847	{.165}	{.331}	{.238}	{.685}

Notes: Data on village size and wealth was collected through a census of study villages carried out in 2013. Household wealth is measured via the Progress out of Poverty Index (PPI). Distance form Freetown and Kahilaun are computed using GPS data. Data on the location and functioning of Peripheral Health Units (PHU) serving each village, and other services such as markets and schools, were collected through a survey of village leaders in October 2015. Each PHU is considered closed if it did not operate for at least one month between July 2014 and September 2015. All distances are measured in miles. Columns 3 through 6 report p-values from a test of equality of means carried out by OLS regression of each village characteristic on a dummy for treatment assignment. The test in Column 6 comes from a regression of outcomes of interest on a dummy variable for PHU closure, restricted to the treatment group. All regressions include strata (district) fixed effects and robust standard errors.

Table 4: Individual Characteristics of Girls, Balance by Treatment Assignment

Means, standard deviations in parentheses
P-value of t-test of equality of means in braces

	All Villages			PHU Open	PHU Closed	Control Villages	Treated Villages
	Control	Treatment	T = C p-value	T = C p-value	T = C p-value	PHU Open = PHU Closed p-value	PHU Open = PHU Closed p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of Girls	696	2,083		2,387	392	696	2,083
A. Characteristics							
Age	14.8	14.8	{.763}	{.745}	{.947}	{.489}	{.850}
	(1.99)	(1.96)					
Enrolled in school	.724	.694	{.289}	{.324}	{.842}	{.206}	{.532}
In any relationship	.372	.374	{.791}	{.698}	{.749}	{.420}	{.600}
Married	.078	.085	{.485}	{.546}	{.783}	{.946}	{.681}
Age at marriage	14.8	14.5	{.271}	{.303}	{.556}	{.0813}	{.096}
	(2.25)	(2.25)					
Age of husband at marriage	27.9	29.3	{.176}	{.042}	{.411}	{.001}	{.998}
	(5.94)	(6.30)					
Has Children	.201	.198	{.859}	{.944}	{.700}	{.802}	{.638}
Has Children, out-of-wedlock	.138	.127	{.371}	{.510}	{.433}	{.563}	{.743}
B. Time Use (hours per week)							
Learning	46.2	43.7	{.192}	{.346}	{.135}	{.213}	{.050}
	(32.7)	(32.5)					
Household Chores	44.7	44.0	{.547}	{.532}	{.782}	{.619}	{.800}
	(21.6)	(20.9)					
Working	17.2	17.0	{.907}	{.858}	{.815}	{.486}	{.171}
	(20.9)	(21.3)					
Engaged in sexual activities with men	3.27	3.17	{.818}	{.989}	{.446}	{.651}	{.865}
	(4.68)	(4.52)					
C. Sexual Activity							
Sexually active	.534	.477	{.083}	{.508}	{.174}	{.585}	{.929}
If active: Age at sexual debut	13.9	13.8	{.146}	{.204}	{.400}	{.245}	{.284}
	(2.00)	(1.70)					
If active: Uses contraceptive	.430	.410	{.561}	{.771}	{.810}	{.909}	{.259}
(any, excluding condoms)	(.496)	(.492)					
If active: Ever used condoms	.104	.092	{.439}	{.260}	{.0846}	{.285}	{.343}
D. Violence Against Girls							
If in relationship: experienced any form of intimate partner violence	.336	.401	{.137}	{.822}	{.007}	{.029}	{.031}
Unwanted sex over past year	.085	.067	{.260}	{.575}	{.725}	{.920}	{.748}

Notes: All data is from the baseline survey. Columns 3 through 7 report p-values from a test of equality of means across treatment groups, carried out by OLS regression of each characteristic on a dummy for assignment to treatment. Columns 6 and 7 report p-values from a test of equality of means across levels of health center function, within the control and treatment group respectively. Regressions include strata (district) dummies and standard errors are clustered at the village level. Intimate partner violence is defined as the threat or use of physical violence from the respondent's partner. Time allocation data was collected both at baseline and endline. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "IGA", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Unwanted Sex is defined as, "Been involved in any sexual intercourse that you were not willing to do".

Table 5: ELA Clubs Functioning and Participation

Sample averages, p-values in braces

	T1	T2	T3	[T1=T2]	[T2=T3]	PHU Closed	PHU Open	Difference p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Functioning								
Months ELA clubs are open (Sep'14 - May'15)	7.92	7.78	7.78	{.675}	{.964}	7.14	7.94	{.227}
B. Participation								
Share of girls attending	.665	.670	.656	{.961}	{.845}	.762	.647	{.178}
Share of girls attending life skills training	.539	.542	.551	{.965}	{.831}	.669	.523	{.018}
Share of girls attending vocational training	-	.209	.231	-	{.440}	.315	.203	{.003}
Share of girls accessing microfinance	-	-	.066	-	-	.102	.099	{.646}

Note: Data on club functioning was collected from ELA mentors in June and July 2015**.** Data on participation in ELA club activities and Life Skill Training was collected for all respondents in treated communities at endline in 2016. Participation in Vocational Training was recorded only for respondents in villages assigned to treated arm T2 and T3. Data on the location and functioning of Peripheral Health Units (PHU) serving each village, and other services such as markets and schools, were collected through a survey of village leaders in October 2015. Each PHU is considered closed if it did not operate for at least one month between July 2014 and September 2015. The p-values refer to a test of equality of conditional means carried out via OLS regression of the outcome of interest on a dummies for treatment assignment - Columns 3 and 4 - or a dummy for PHU functioning - Column 8 - and strata fixed effects. Standard errors are robust in panel A, and clustered at the village level in Panel B.

Table 6: ELA Clubs, Pregnancy, Time Use and School Enrolment

Outcomes measured post-epidemic (2016)

ANCOVA estimates, standard errors in parentheses

	Pregnancy		Time Use: ELA Clubs and Socializing (hours/week)					Activities	
	Ever pregnant	Pregnant out of wedlock	ELA Club	Men	Alone	Friends	Volunteer/Church	Enrolled in School	Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ELA	-.015	-.032**	3.12***	-.546***	-.650***	-.521***	-1.55***	.002	.021
	(.018)	(.016)	(.147)	(.189)	(.193)	(.196)	(.262)	(.022)	(.028)
Control mean at baseline	.199	.138	-	3.27	6.01	6.26	10.7	.724	.430
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779

Outcomes: All pregnancy outcomes refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "IGA", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". "Friends" refers to socializing taking place outside of the ELA club. The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Column 8 captures school enrolment and Column 9 captures engagement in any income generating activity - whether self-employment or wage , occasional or stable, paid or unpaid. The two outcomes are not mutually exclusive, and respondents can engage in both.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table 7: Safe Spaces, Pregnancy, Time Use and School Enrolment

Outcomes measured post-epidemic (2016)

ANCOVA estimates, standard errors in parentheses

	Pregnancy		Time Use: ELA Clubs and Socializing (hours/week)					Activities	
	Ever pregnant	Pregnant out of wedlock	ELA Club	Men	Alone	Friends	Volunteer/Church	Enrolled in School	Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PHU closed (β_1)	.102***	.081**	-	1.08***	1.19***	.291	-.086	-.175***	.172***
	(.030)	(.039)	-	(.351)	(.380)	(.385)	(.625)	(.056)	(.056)
ELA | PHU closed (β_2)	-.051	-.098***	3.17***	-1.52***	-1.28***	-.782*	-1.72***	.143**	-.062
	(.032)	(.037)	(.283)	(.371)	(.452)	(.409)	(.594)	(.057)	(.060)
ELA | PHU open (β_3)	-.010	-.021	3.11***	-.379*	-.548***	-.477**	-1.52***	-.022	.034
	(.020)	(.016)	(.157)	(.201)	(.189)	(.216)	(.289)	(.021)	(.029)
$\beta_1+\beta_2$	.051*	-.016	-	-.441	-.093	-.491	-1.81***	-.032	.110
	(.028)	(.021)	-	(.288)	(.364)	(.315)	(.389)	(.030)	(.047)
p-value	{.073}	{.427}	-	{.128}	{.798}	{.121}	{.000}	{.282}	{.019}
95% CI	[-.005;.107]	[-.057;.024]	-	[-1.01;.127]	[-.811;.624]	[-1.11;.131]	[-2.58;-1.04]	[-.090;.026]	[.018;.202]
t-test: $\beta_2 = \beta_3$	{.273}	{.058}	{.833}	{.008}	{.126}	{.506}	{.758}	{.007}	{.146}
Control mean at baseline	.199	.138	-	3.27	6.01	6.26	10.7	.458	.121
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779

Outcomes: All pregnancy outcomes refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "IGA", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". "Friends" refers to socializing taking place outside of the ELA club. The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Column 8 captures school enrolment and Column 9 captures engagement in any income generating activity - whether self-employment or wage , occasional or stable, paid or unpaid. The two outcomes are not mutually exclusive, and respondents can engage in both.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table 8: Safe Spaces, Life Skills, and Social Ties

Outcomes measured post-epidemic (2016)

ANCOVA estimates, standard errors in parentheses

	Sexual Behavior and Knowledge					Social Ties			
	Ever used condom	Currently using other contraceptives	Pregnancy knowledge index	HIV Knowledge Index	Sexually active	Friends	Income generating activities	Credit	Intimate topics
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PHU closed (β_1)	.008	-.061	-.036	-.008	.045	-.290***	-.022	-.063	.018
	(.027)	(.079)	(.036)	(.016)	(.044)	(.090)	(.069)	(.083)	(.081)
ELA | PHU closed (β_2)	.005	.071	.060	.036*	-.084*	.340***	.196**	.201**	.117
	(.024)	(.088)	(.037)	(.020)	(.045)	(.112)	(.080)	(.093)	(.095)
ELA | PHU open (β_3)	-.009	.019	-.001	.001	.000	.120*	.099**	.060	.033
	(.022)	(.035)	(.015)	(.011)	(.018)	(.066)	(.047)	(.048)	(.040)
$\beta_1+\beta_2$	.013	.010	.023	.028	-.039	.050	.174**	.137	.135*
	(.028)	(.065)	(.021)	(.019)	(.028)	(.122)	(.076)	(.084)	(.078)
p-value	{.649}	{.873}	{.264]	{.150}	{.174}	{.682}	{.024}	{.104}	{.085}
95% CI	[-.042;.067]	[-.118;.138]	[-.018;.065]	[-.010;.066]	[-.095;.017]	[-.191;.291]	[.024;.324]	[-.028;.303]	[-.019;.289]
t-test: $\beta_2 = \beta_3$	{.673}	{.584}	{.123}	{.110}	{.085}	{.092}	{.298}	{.173}	{.408}
Control mean at baseline	.113	.427	.606	.580	.515	2.10	.757	.861	.822
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,664	1,664	2,779	2,779	2,303	1,854	1,854	1,854	1,854

Outcomes: Data on sexual behaviors was collected only from those teenage girls that consented to answering this specific survey module. Of the 2,779 respondents in our estimation sample, 476 opted to not answer the module at endline, and this explains the difference in sample size between Column 4, using the full estimation sample, and Column 5. Respondents were then asked whether they are sexually active. Follow up questions, such as those on contraceptive use, were asked only to sexually active young women. Hence, the differences in sample size Columns 5 and Columns 1 and 2. All outcomes in this table are measured at endline. The outcome in Column 1 is a dummy equal to 1 if the respondent has ever used condoms during intercourse. The outcome in Column 2 captures usage of any form of contraceptive other than condoms, that is contraceptive pill, IUDs or implants, sterilization/partner's vasectomy. The outcome in Column 3 is the share of correct answers to a set of three true/false questions on reproductive health: "A women cannot become pregnant at first intercourse or with occasional sexual relation"; "A woman who is breastfeeding can become pregnant"; "From one menstrual period to the next, there days when a woman is more likely to become pregnant if she has sexual relations". The HIV knowledge index in column 4 is constructed from answers to the following true/false questions: "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; "Pulling out the penis before a man climaxes keeps a woman from getting HIV during sex"; " A women cannot get HIV if she has sex during her period"; "Taking a test for HIV one week after having sex will tell a person if she or he has HIV"; "A Pregnant woman with HIV can give the virus to her unborn baby". Data on social networks was collected both at baseline and endline for a random subsample of study participants. Respondents were asked to separately list friends (Column 6) as well as people with whom they discuss "issues related to income-generating activities, for example concerning your employer, your business, agriculture, use of resources, etc." (Column 7), "finance and credit" (Column 8), and "intimate topics such as relationships with boys and men (husband, boyfriend, partner), gender-based violence, personal hygiene, etc." (Column 9). The outcomes used in these four columns is the number of social ties listed under each category.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications, control for baseline values of the outcome variable, with the only exception being Columns 1 and 2. Since sexual behaviors data was collected only for sexually active women, in the first two columns we control instead for whether the respondent was sexually active at baseline. All regressions include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table 9: Mechanisms - Safe Spaces, Vocational Training or Microfinance

Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

	Pregnancy		Time Use: ELA Clubs and Socializing (hours/week)					Activities	
	Ever pregnant	Pregnant out of wedlock	ELA Club	Men	Alone	Friends	Volunteer/Church	Enrolled in School	Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ELA T1: Safe space + Life skills	-.014	-.028	3.25***	-.564**	-.718***	-.412*	-1.53***	.001	.009
	(.023)	(.019)	(.198)	(.255)	(.230)	(.232)	(.305)	(.027)	(.035)
ELA T2: Safe space + Life skills + Vocational training	-.044**	-.055***	2.99***	-.648***	-.552**	-.561**	-1.51***	.033	.009
	(.021)	(.017)	(.208)	(.248)	(.236)	(.231)	(.283)	(.026)	(.040)
ELA T3: Safe space + Life skills + Vocational training + Microfinance	.011	-.014	3.11***	-.433**	-.679***	-.588***	-1.61***	-.026	.043
	(.021)	(.019)	(.234)	(.205)	(.224)	(.221)	(.326)	(.025)	(.031)
Control mean at baseline	.201	.138	-	3.27	6.01	6.26	10.7	.724	.430
t-test: T1==T2	{.173}	{.095}	{.331}	{.759}	{.448}	{.477}	{.948}	{.211}	{.994}
t-test: T1==T3	{.244}	{.439}	{.642}	{.581}	{.859}	{.371}	{.774}	{.266}	{.285}
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779

Outcomes: All pregnancy outcomes in this table refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "Income Generating Activities (IGA)", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Column 7 captures school enrolment and Column 8 captures engagement in any income generating activity - whether self-employment or wage work, occasional or stable, paid or unpaid. The two outcomes are not mutually exclusive, and respondents can engage in both.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table 10: Safe Spaces and Unmarried Women

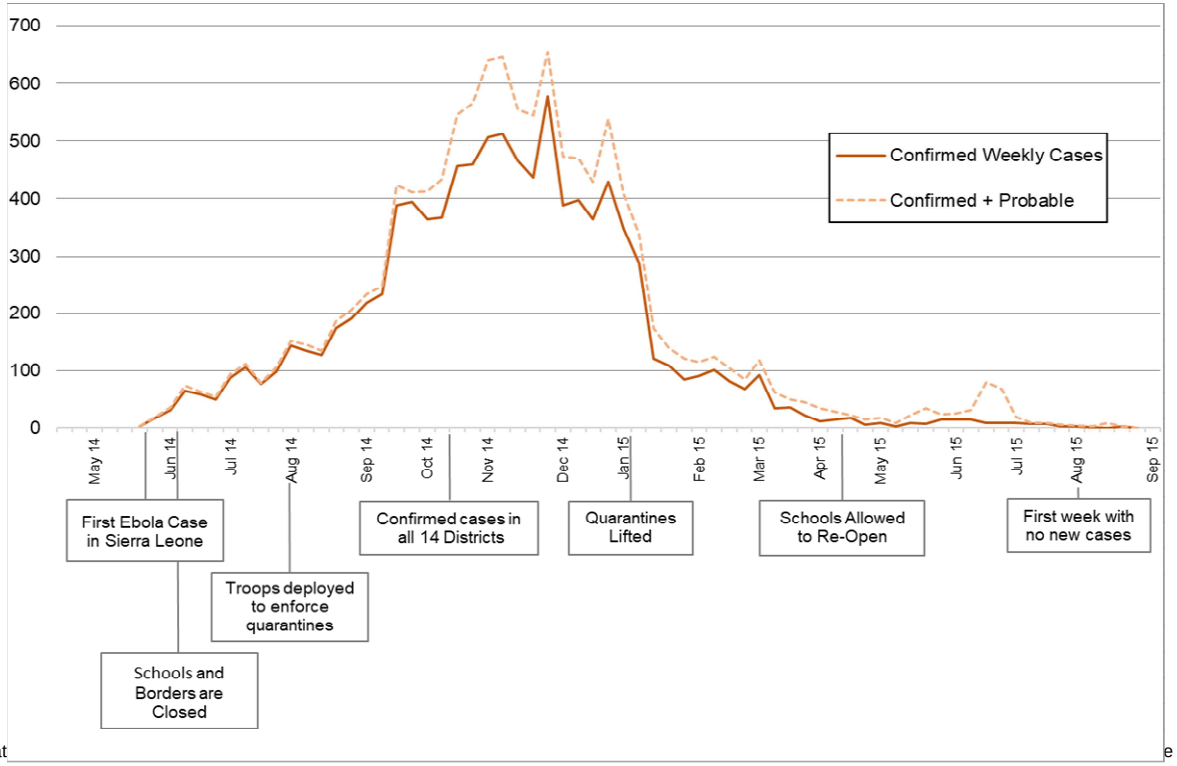
Sample: Unmarried women aged 19-25 at baseline
Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

	Time Use		Pregnancy and Marriage			Relationships		
	ELA Club	Men	Pregnant out of wedlock	Any relationship	Married	Violent relationship	Transactional Sex	Unwanted Sex
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PHU closed (β_1)		1.62	.108	.049	.115	-.264***	-.071**	-.128***
		(1.08)	(.094)	(.054)	(.099)	(.070)	(.030)	(.034)
ELA | PHU closed (β_2)	2.53***	-1.82*	-.060	-.021	-.226**	.288***	.106***	.148***
	(.323)	(1.013)	(.091)	(.045)	(.092)	(.075)	(.036)	(.042)
ELA | PHU open (β_3)	2.90***	-.767*	.045	.015	-.022	.093**	.019	.017
	(.189)	(.439)	(.036)	(.028)	(.043)	(.044)	(.023)	(.021)
$\beta_1+\beta_2$		-.207	.048	.029	-.111	.024	.035	.021
		(.606)	(.054)	(.034)	(.059)	(.074)	(.042)	(.054)
p-value		{.733}	{.379}	{.397}	{.063}	{.745}	{.400}	{.705}
95% CI		[-1.40;.989]	[-.059;.155]	[-.038;.096]	[-.229;.006]	[-.122;.17]	[-.047;.118]	[-.086;.127]
t-test: $\beta_2 = \beta_3$	{.280}	{.341}	{.280}	{.507}	{.046}	{.025}	{.043}	{.006}
Control mean at baseline		7.08	.803	.740	.000	.299	.063	.132
Observations	851	851	851	851	851	851	780	780

Outcomes: All pregnancy outcomes in this table refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "Income Generating Activities (IGA)", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Respondents were asked about the incidence of intimate partner violence within their current relationship. The outcome variable in Column 6 is a dummy variable equal to 1 if the respondent is in a relationship and reports any form of IPV. Data on transactional and unwanted sex was collected only from those women that reported being sexually active and consented to answering the survey module on sexual behaviors, driving the difference in sample sizes between Columns 1 through 6, and Columns 7 and 8. The exact phrasing of the questions on transactional and unwanted sex are: "During the past one year, have you received anything such as money, gifts, help with schoolwork or something else, which was given to you in exchange for sexual intercourse?" "Have you been involved in any sexual intercourse that you were not willing to do during the past one year?"

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Figure 1: Timeline of the Ebola Epidemic in Sierra Leone



Notes: Dat e cases refer to cases diagnosed by clinical staff and but not tested.

Figure 2: Study Timeline

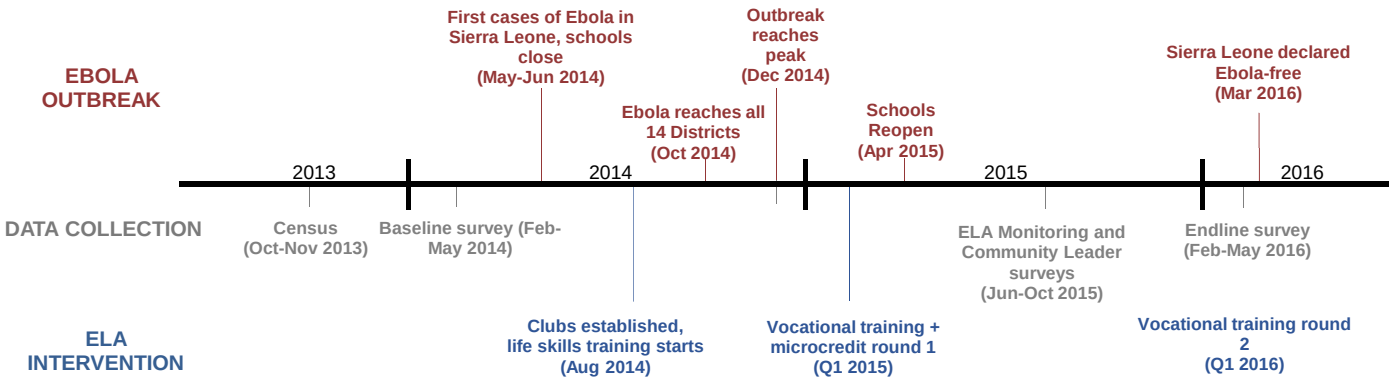
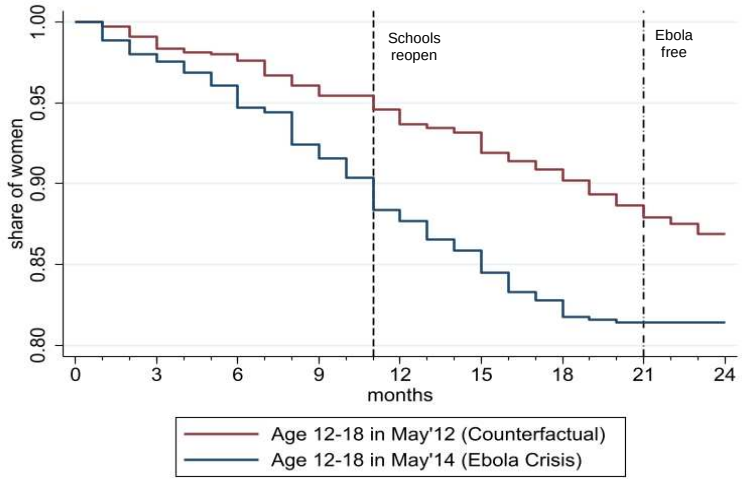
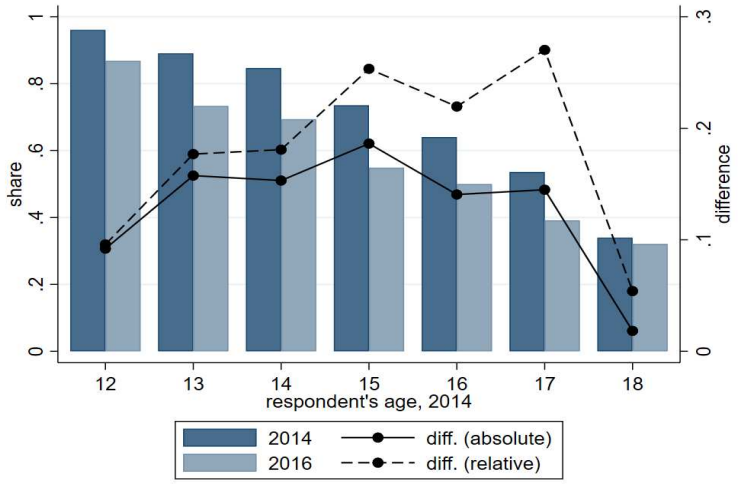


Figure 3: Schooling and Pregnancy Over the Epidemic, Controls

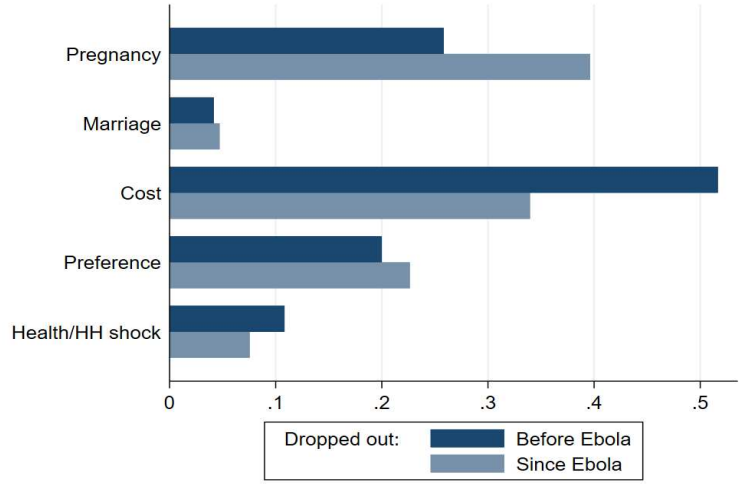
A. Time to Conception, First Pregnancy
Control Villages



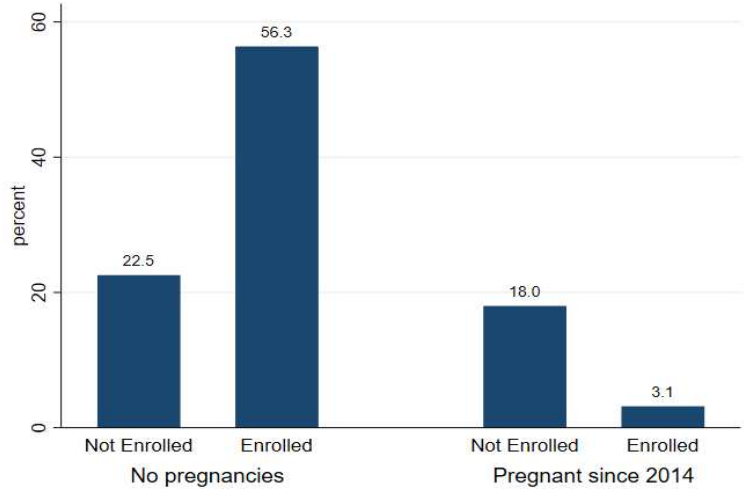
B. School Enrolment Rates, by Age
Pre and Post-epidemic, Control Villages



C. Reasons for School Dropout by Dropout Date
Girls Aged 12-18 at Baseline, Control Villages



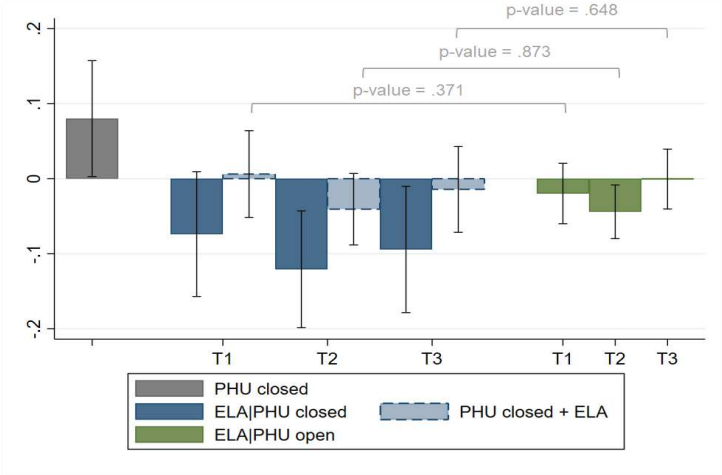
D. Endline Enrolment and Fertility During the Epidemic
As a Share of Girls Aged 12-18 in 2014, Control Villages



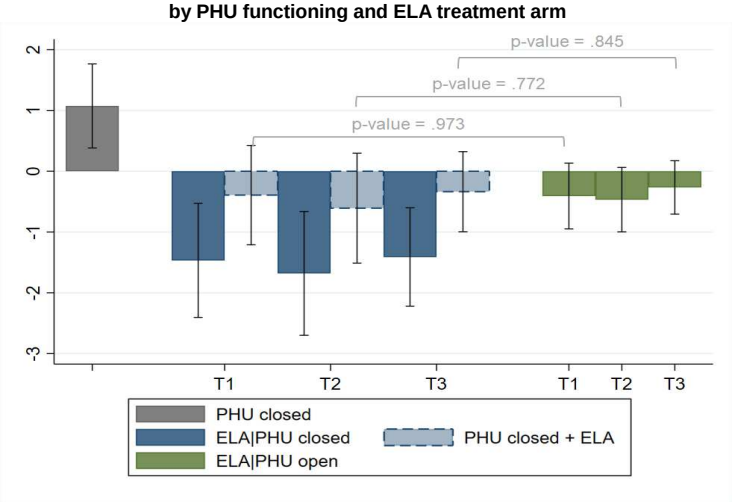
Notes: Every panel uses only data from control villages. Panel A depicts Kaplan-Meyer survival functions for respondents aged 12-18 at the beginning of the stated periods (May '12 or May '14) who did not experience any pregnancy before. The counterfactual sample is constructed using also data from older women in the same village, collected using the same survey instrument and sampling strategy. Respondents' pregnancy histories are used to generate a pseudo-panel with monthly observations where, in keeping with the terminology of survival analysis, each individual's failure variable switches to 1 when the respondent becomes pregnant for the first time. Panels B reports averages for the sample of young women aged 12-18 years old at baseline and tracked between baseline (2014) and endline (2016). Panel C reports the share of school dropouts in our sample who mentions each of the listed reasons as motivating their decision. Among the reasons for dropping out, the Preference category collects all those answers indicating that the respondent chose to leave school. Common answers in this category are "did not find it interesting" or "too difficult". The category Health/HH Shock includes all instances of non-financial shocks that affected respondents, such as sickness or family circumstances that forced the respondent out of schooling. The category HH Preference includes all those answers pointing to the decision of leaving school having been taken by the respondents' parents or guardians.

Figure 4: Heterogeneous Effects of ELA Clubs

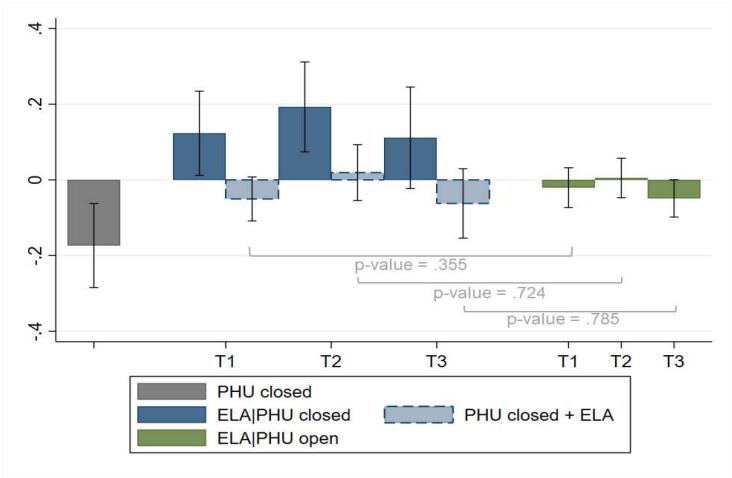
A. Pregnant out-of-wedlock, endline
by PHU functioning and ELA treatment arm



B. Time Spent with Men, hours per week, endline
by PHU functioning and ELA treatment arm



C. School Enrolment, endline
by PHU functioning and ELA treatment arm



Notes: Figures report coefficient estimates from regressions that split treatment assignment by treatment arm. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications control for baseline values of the outcome variable and include district fixed effects (randomization strata). Standard errors are clustered at the unit of randomization (village). Additionally, the figure reports (i) 95% confidence intervals for each coefficient (vertical black lines), and (ii) p-values from t-tests of equality of each treatment effect across levels of PHU functioning.

Table A1: Attrition

Dependent Variable = 1 if girl is tracked from baseline to endline
OLS estimates, standard errors in parentheses
P-values of joint-significance test in braces

	(1) PHU Status	(2) PHU Status	(3) ELA Clubs	(4) ELA Clubs	(5) ELA Clubs and PHU Status
PHU closed	-.034	-.020			-.033
	(.048)	(.040)			(.040)
ELA Treatment			.001	-.012	-.016
			(.017)	(0.17)	(.019)
ELA Treatment x PHU Closed					.029
					(.047)
Individual Controls		✓		✓	✓
F-Test		{.039}		{.003}	{.004}
Village Controls		✓		✓	✓
F-Test		{.798}		{.283}	{.273}
Mean of outcome variable	.829	.829	.831	.831	.831
R-squared	.034	.055	.013	.021	.022
Sample	Control villages	Control villages	Entire sample	Entire sample	Entire sample
Observations	845	831	3,355	3,310	3,310

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include baseline school enrolment and employment, marital status, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All regressions include district fixed effects (randomization strata) and age dummies, and standard errors are clustered at the unit of randomization (village).

Table A2: PHU Closures, Sexual Behavior and Knowledge, and Social Ties

Sample: Control villages only
Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

	Sexual Behavior and Knowledge					Social Ties			
	Ever used condom	Currently using other contraceptives	Pregnancy knowledge index	HIV knowledge index	Sexually active	Friends	Income generating activities	Credit	Intimate topics
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PHU closed	-.003	-.080	-.022	-.017	.059	-.264**	.084	.043	.073
	(.031)	(.085)	(.038)	(.021)	(.039)	(.115)	(.081)	(.112)	(.119)
Control mean at baseline	.101	.423	.609	.580	.531	2.09	.846	.936	.848
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	433	433	696	696	582	454	454	454	454

Outcomes: Data on sexual behaviors is collected only for those teenage girls that consent to answering this specific survey module. Among respondents in control villages, 114 opted to not answer the module at endline, and this explains the difference in sample size between Column 3, using the full estimation sample, and Column 4. Respondents were then asked whether they are sexually active. Follow up questions, such as those on contraceptive use, were asked only to sexually active young women. Hence, the difference in sample size between Column 4, and Columns 1 and 2. All outcomes in this table are measured at endline. The outcome in Column 1 is a dummy equal to 1 if the respondent has ever used condoms during intercourse. The outcome in Column 2 captures usage of any form of contraceptive other than condoms, that is contraceptive pills, IUDs or implants, sterilization/partner's vasectomy. The outcome in Column 3 is the share of correct answers to a set of three true/false questions on reproductive health: "A women cannot become pregnant at first intercourse or with occasional sexual relation"; "A woman who is breastfeeding can become pregnant"; "From one menstrual period to the next, there days when a woman is more likely to become pregnant if she has sexual relations". The HIV knowledge index in column 4 is constructed from answers to the following true/false questions: "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; "Pulling out the penis before a man climaxes keeps a woman from getting HIV during sex"; " A women cannot get HIV if she has sex during her period"; "Taking a test for HIV one week after having sex will tell a person if she or he has HIV"; "A Pregnant woman with HIV can give the virus to her unborn baby". Data on social networks was collected both at baseline and endline for a random subsample of study participants. Respondents were asked to separately list friends (Column 6) as well as people with whom they discuss "issues related to income-generating activities, for example concerning your employer, your business, agriculture, use of resources, etc." (Column 7), "finance and credit" (Column 8), and "intimate topics such as relationships with boys and men (husband, boyfriend, partner), gender-based violence, personal hygiene, etc." (Column 9). The outcomes used in these four columns is the number of social ties listed under each category.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications, control for baseline values of the outcome variable, with the only exception being Columns 1 and 2. Since sexual behaviors data was collected only for sexually active women, in the first two columns we control instead for whether the respondent was sexually active at baseline. All regressions include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table A3: PHU Closures, Pregnancy, Time Use and School Enrolment at Baseline

Sample: Control villages only at baseline
Outcomes measured at baseline, pre-epidemic (2014)
ANCOVA estimates, standard errors in parentheses

	Pregnancy		Time Use Socializing (hours/week)				Activities	
	Ever pregnant	Pregnant out of wedlock	Men	Alone	Friends	Volunteer/Church	School	Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PHU closed	.009	.024	.169	-.025	.560	1.15	-.038	.052
	(.037)	(.036)	(.574)	(.501)	(.542)	(.825)	(.046)	(.101)
Control mean at baseline	.201	.138	3.27	6.01	6.26	10.7	.724	.430
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	696	696	696	696	696	696	696	696

Outcomes: All pregnancy outcomes in this table refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "Income Generating Activities (IGA)", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Column 7 captures school enrolment and Column 8 captures engagement in any income generating activity - whether self-employment or wage work, occasional or stable, paid or unpaid. The two outcomes are not mutually exclusive, and respondents can engage in both.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the village.

Table A4: ELA Life Skills Modules

Module 1 - Adolescence and Puberty
Topics: Adolescence, Hormones, Puberty, Body changes during puberty, Reproductive organs

Overall aims: Define adolescence and describe characteristics and body changes associated with it; understand issues typically associated with adolescence

Module 2 - Menstruation
Topics: Menstruation and menstrual cycle, Menarche and menopause, Hygiene during menstruation, Menstrual disorders

Overall aims: Define menstruation; discuss pain and changes during menstruation, and care of a woman's body; understand premenstrual syndrome

Module 3 - Family planning
Topics: Family planning, Fertility regulation, Contraceptive methods

Overall aims: Define family planning and the various methods of contraception; explain the value of fertility regulation and issues pertaining abortion; discuss the reasons for non-use of contraceptives

Module 4 - Sexually Transmitted Infections (STIs)
Overall aims: Discuss the effects of various STIs, how they are transmitted and how to prevent them

Module 5 - HIV/AIDS
Overall aims: Define HIV/AIDS and understand the difference, identify risky behaviour, discuss effects and prevention

Module 6 - (Teenage) pregnancy
Overall aims: Define (teenage) pregnancy, describe factors that can lead to teenage pregnancy and the associated problems, discuss prevention and ante-natal/maternal care

Module 7 - Gender & Marriage
Topics: Gender, Gender roles & gender inequality, (Early) marriage, Bride price

Overall aims: Understand the meaning of and issues with gender, gender roles, gender issues, bride price and early marriage

Module 8 - Rape
Overall aims: Define and understand rape, know how to report, identify risky situations and understand the consequences of rape

Module 9 - Leadership among adolescents
Topics: Leadership, Qualities of leaders, Behaviours of leaders

Overall aims: Define leadership and describe the qualities of a good leader, identify leaders in their community, discuss how one can become a good leader/mentor.

Module 10 - Adolescent responsibility to family and community
Overall aims: Define responsibility, family and community, describe adolescents' responsibility to their family and community

Table A5: Robustness, Standard Errors

Outcomes measured post-epidemic (2016), control villages only
ANCOVA estimates, standard errors in parentheses, p-values in braces

		Pregnant out of wedlock	Time Spent with Men	Enrolled in School
		(1)	(2)	(3)
ELA treatment		.105**	1.26***	-.201***
	clustered: village	(.040)	(.449)	(.052)
	clustered: age	(.048)	(.393)	(.051)
	clustered: district	(.025)	(.818)	(.027)
	robust	(.047)	(.550)	(.051)
Control mean at baseline		.138	3.12	.736
Observations		696	696	696

Outcomes: The fertility outcome capture pregnancies that occurred during the study period, i.e. between baseline (2014) and endline (2016). Time allocation data was collected by asking respondents to allocate a set of 25 beads on a board with 6 circles representing: "Learning Activities", "IGA", "socializing", "Household Chores", "Sleep" and "Other". The Learning category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondent were then asked to allocate beads into each circle in a way that represents time allocation in an average day, and data points were later converted into weekly hours. A similar procedure was implemented to record allocation of socializing time across the following activities: "Friends", "Men", "Alone", "Church", "Volunteer" and "Other". The exact phrasing for the "Men" category is, "With boys or men you have a sexual relationship with.". Using the number of hours spent on total socializing time from the previous step, these allocations were later converted into weekly hours.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications, control for baseline values of the outcome variable and include district fixed effects (randomization strata). The table reports standard error clustered at the village, respondents' year of birth, and district level, together with robust standard errors.

Table A6: Robustness, Standard Errors

Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

	Pregnant out of wedlock	Time Spent with Men	Enrolled in School
	(1)	(2)	(3)
PHU closed (β_1)	.081**	1.08***	-.175***
clustered: village	(.039)	(.351)	(.056)
clustered: age	(.049)	(.451)	(.031)
clustered: district	(.012)	(.256)	(.023)
robust	(.042)	(.48)	(.045)
randomisation-t p-values	{.051}	{.009}	{.005}
ELA | PHU closed (β_2)	-.098***	-1.52***	.143**
clustered: village	(.037)	(.371)	(.057)
clustered: age	(.051)	(.427)	(.044)
clustered: district	(.016)	(.073)	(.031)
robust	(.042)	(.494)	(.047)
randomisation-t p-values	{.017}	{.003}	{.047}
ELA | PHU open (β_3)	-.021	-.379*	-.022
clustered: village	(.016)	(.201)	(.021)
clustered: age	(.02)	(.161)	(.017)
clustered: district	(.017)	(.158)	(.015)
robust	(.017)	(.213)	(.019)
randomisation-t p-values	{.204}	{.092}	{.316}
Control mean at baseline	.138	3.12	.736
Observations	2,779	2,779	2,779

Outcomes: The fertility outcome capture pregnancies that occurred during the study period, i.e. between baseline (2014) and endline (2016). Time allocation data was collected by asking respondents to allocate a set of 25 beads on a board with 6 circles representing: "Learning Activities", "IGA", "socializing", "Household Chores", "Sleep" and "Other". The Learning category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondent were then asked to allocate beads into each circle in a way that represents time allocation in an average day, and data points were later converted into weekly hours. A similar procedure was implemented to record allocation of socializing time across the following activities: "Friends", "Men", "Alone", "Church", "Volunteer" and "Other". The exact phrasing for the "Men" category is, "With boys or men you have a sexual relationship with.". Using the number of hours spent on total socializing time from the previous step, these allocations were later converted into weekly hours.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications, control for baseline values of the outcome variable and include district fixed effects (randomization strata). The table reports standard error clustered at the village, respondents' year of birth, and district level, together with robust standard errors. Randomization-t p-values are computed following Young [2019]**.**

Table A7: Robustness Checks

Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

	Control Variables						Common Support Villages			Ebola cases			
	Pregnant out of wedlock	Time Spent with Men	Enrolled in School	Pregnant out of wedlock	Time Spent with Men	Enrolled in School	Pregnant out of wedlock	Time Spent with Men	Enrolled in School	Household	Extended Family	Household	Extended Family
	Control villages			Whole sample			Common support villages			Control villages		Whole sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PHU closed (β_1)	.086*	1.18***	-.185***	.088**	1.17***	-.192***	.078**	1.07***	-.171***	-.010	.074	-.003	.057
	(.045)	(.348)	(.054)	(.042)	(.347)	(.051)	(.039)	(.347)	(.055)	(.027)	(.088)	(.021)	(.082)
ELA | PHU closed (β_2)				-.102**	-1.47***	.140***	-.099***	-1.52***	.142**			.030	-.016
				(.039)	(.358)	(.050)	(.036)	(.360)	(.055)			(.036)	(.092)
ELA | PHU open (β_3)				-.011	-.324	-.037	-.026	-.424*	-.020			-.007	-.043*
				(.017)	(.240)	(.025)	(.018)	(.227)	(.023)			(.011)	(.024)
Control mean at baseline	.138	3.27	.724	.138	3.27	.724	.140	3.49	.682	.030	.161	.030	.161
Individual controls	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓
Village controls	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓
Observations	696	696	696	2,779	2,779	2,779	2,405	2,405	2,405	696	696	2,779	2,779

Outcomes: All pregnancy outcomes refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "IGA", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications, control for baseline values of the outcome variable, except Columns 10 through 13, and include district fixed effects (randomization strata). All control means are computed with baseline data, except Columns 10 through 13 where outcomes are measured only at endline. Columns 7 through 9 restrict the sample to villages that host between 34 and 186 households, as this represents the common support of village sizes between communities with different degrees of PHU functioning.

Table A8: Remoteness

Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

	Pregnancy		Time Use: ELA Clubs and Socializing (hours/week)					Activities	
	Ever pregnant	Pregnant out of wedlock	ELA Club	Men	Alone	Friends	Volunteer/Church	Enrolled in School	Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Distance from District Capital	.001	.001	-.003	.001	-.005	.014	.022	-.002	-.005**
	(.001)	(.002)	(.010)	(.013)	(.015)	(.016)	(.030)	(.002)	(.002)
PHU closed (β_1)	.081	.154***		.241	.339	-.503	-1.45*	-.193	.062
	(.099)	(.051)		(.738)	(.570)	(.600)	(.795)	(.133)	(.090)
PHU closed (β_1) X Distance	.000	-.005		.075*	.077	.076*	.128**	.002	.009
	(.006)	(.004)		(.044)	(.048)	(.040)	(.054)	(.008)	(.006)
ELA | PHU closed (β_2)	-.122	-.141**	2.82***	-.957	-.547	.123	-.119	.144	-.106
	(.097)	(.056)	(.641)	(.842)	(.686)	(.703)	(.826)	(.139)	(.106)
ELA | PHU closed (β_2) X Distance	.001	.007	.025	-.057	-.068	-.084*	-.146***	.000	.002
	(.006)	(.005)	(.042)	(.052)	(.066)	(.050)	(.050)	(.008)	(.007)
ELA | PHU open (β_3)	-.018	-.019	3.21***	-.570**	-.643**	-.333	-1.47***	-.013	-.021
	(.026)	(.034)	(.282)	(.274)	(.279)	(.330)	(.469)	(.033)	(.051)
ELA | PHU open (β_3) X Distance	-.000	.001	-.009	.016	.007	-.011	-.003	-.001	.004
	(.001)	(.002)	(.015)	(.015)	(.020)	(.018)	(.033)	(.002)	(.003)
Control mean at baseline	.199	.138	-	3.27	6.01	6.26	10.7	.458	.121
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779

Outcomes: All pregnancy outcomes refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "IGA", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Column 8 captures school enrolment and Column 9 captures engagement in any income generating activity - whether self-employment or wage , occasional or stable, paid or unpaid. The two outcomes are not mutually exclusive, and respondents can engage in both.

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). Distance from the District Capital represents travel distance via road and is measured in miles via OSRM. On average, the 200 villages in our sample are located 12.9 miles away from their district capital. All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table A9: Sexual Behavior and Knowledge

Outcomes measured post-epidemic (2016)

ANCOVA estimates, standard errors in parentheses

	Ever used condom	Currently using other contraceptives	Pregnancy knowledge index	HIV knowledge index	Sexually active
	(1)	(2)	(3)	(4)	(5)
ELA T1: Safe space + Life skills	-.027	.035	.005	.011	.004
	(.024)	(.039)	(.017)	(.013)	(.022)
ELA T2: Safe space + Life skills + Vocational training	.001	.033	.019	-.004	-.022
	(.021)	(.040)	(.017)	(.761)	(.021)
ELA T3: Safe space + Life skills + Vocational training + Microfinance	.004	.017	.001	.011	-.020
	(.022)	(.041)	(.017)	(.011)	(.021)
Control mean at baseline	.101	.423	.609	.573	.531
t-test: T1==T2	{.170}	{.965}	{.409}	{.250}	{.210}
t-test: T1==T3	{.193}	{.658}	{.775}	{.955}	{.266}
Individual controls	✓	✓	✓	✓	✓
Village controls	✓	✓	✓	✓	✓
Observations	1,664	1,664	2,779	2,779	2,303

Outcomes: Data on sexual behaviors collected only from those young women that consented to answering this specific survey module. Of the 2,779 respondents in our estimation sample, 476 opted to not answer the module at endline, and this explains the difference in sample size between Column 3, using the full estimation sample, and Column 4. Respondents were then asked whether they are sexually active. Follow up questions, such as those on contraceptive use, were asked only to sexually active young women. Hence, the differences in sample size columns 4, and Columns 1 and 2. All outcomes in this table are measured at endline. The outcome in Column 1 is a dummy equal to 1 if the respondent has ever used condoms during intercourse. The outcome in Column 2 captures usage of any form of contraceptive other than condoms, that is contraceptive pill, IUDs or implants, sterilization/partner's vasectomy. The outcome in Column 3 is the share of correct answers to a set of three true/false questions on reproductive health: "A women cannot become pregnant at first intercourse or with occasional sexual relation"; "A woman who is breastfeeding can become pregnant"; "From one menstrual period to the next, there days when a woman is more likely to become pregnant if she has sexual relations". The HIV knowledge index in column 4 is constructed from answers to the following true/false questions: "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; "Pulling out the penis before a man climaxes keeps a woman from getting HIV during sex"; " A women cannot get HIV if she has sex during her period"; "Taking a test for HIV one week after having sex will tell a person if she or he has HIV"; "A Pregnant woman with HIV can give the virus to her unborn baby".

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Table A10: Safe Spaces and Married Women

Sample: Married women aged 19-25 at baseline
Outcomes measured post-epidemic (2016)
ANCOVA estimates, standard errors in parentheses

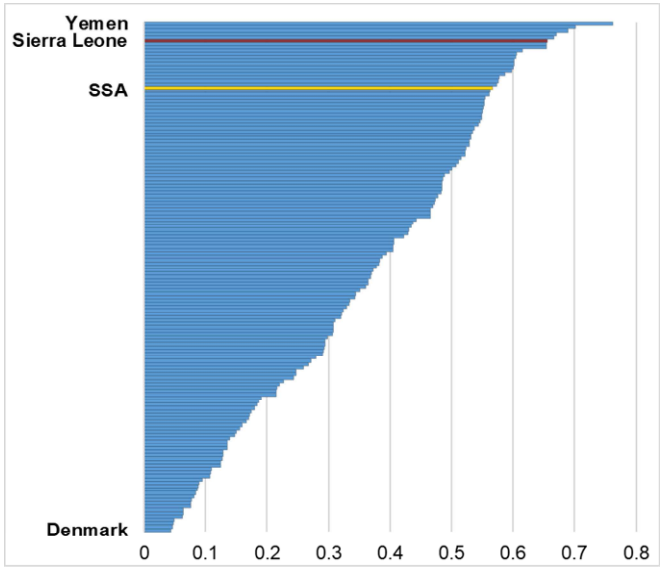
	Time Use		Pregnancy	Relationships		
	ELA Club	Men	Pregnant out of wedlock	Violent relationship	Transactional Sex	Unwanted Sex
	(1)	(2)	(3)	(4)	(5)	(6)
PHU closed (β_1)		-.079	.013	-.025	.011	-.019
		(.788)	(.033)	(.067)	(.023)	(.033)
ELA | PHU closed (β_2)	3.21***	-.379	-.006	.012	.031	.029
	(.326)	(.783)	(.032)	(.063)	(.026)	(.038)
ELA | PHU open (β_3)	2.59***	-.833**	.027	-.071*	.013	-.019
	(.193)	(.386)	(.019)	(.040)	(.013)	(.020)
$\beta_1+\beta_2$		-.458	.007	-.013	.042	.010
		(.493)	(.025)	(.053)	(.020)	(.039)
p-value		{.354}	{.779}	{.812}	{.041}	{.806}
95% CI		[-1.43;.513]	[-.042;.056]	[-.117;.092]	[.002;.082]	[-.068;.087]
t-test: $\beta_2 = \beta_3$	{.078}	{.6}	{.385}	{.277}	{.531}	{.259}
Control mean at baseline		8.07	.000	.641	.038	.184
Observations	1150	1150	1150	1150	1067	1067

Outcomes: All pregnancy outcomes in this table refer to conceptions after baseline data was collected. Time use outcomes measured in hours per week. Respondents were provided a set of 25 beads and a board with six circles representing: "Education", "Income Generating Activities (IGA)", "Leisure", "Household Chores", "Sleep" and "Other". The Education category includes schooling, vocational training and study time. "IGA" includes paid and unpaid work of any kind. Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. Data on leisure time allocation was collected in a similar way. The recorded categories for leisure are: "Friends", "Men", "Alone", "Church", "Volunteer", "ELA club" and "Other". The exact phrasing for the "Men" category is "With boys or men you have a sexual relationship with". Respondents were then asked to allocate beads into each circle in a way that represents time allocation in an average week. The data points were later converted into weekly hours using recorded total leisure time from the first exercise. Respondents were asked about the incidence of intimate partner violence within their current relationship. The outcome variable in column 6 is a dummy variable equal to 1 if the respondent is in a relationship and reports any form of IPV. Data on transactional and unwanted sex was collected only from those women that reported being sexually active and consented to answering the survey module on sexual behaviors, driving the difference in sample sizes between Columns 1 through 6, and Columns 7 and 8. The exact phrasing of the questions on transactional and unwanted sex are: "During the past one year, have you received anything such as money, gifts, help with schoolwork or something else, which was given to you in exchange for sexual intercourse?" "Have you been involved in any sexual intercourse that you were not willing to do during the past one year?"

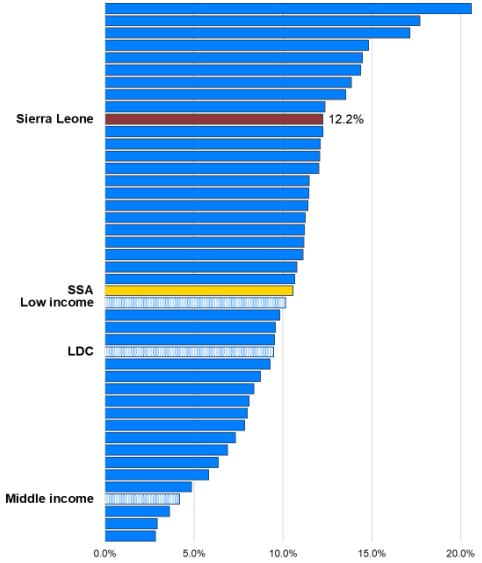
Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Individual control variables include age dummies, wealth measured through the Progress of Poverty Index (PPI), household size and a dummy equal to 1 if the respondent is illiterate. Village-level controls include the number of dwellings, average PPI, a dummy equal to 1 if the paramount chief resides in the village, as well as distances from: closest market, secondary school and primary health unit (PHU), as well as the capital Freetown and Kailahun (the location of the first reported Ebola case). All specifications include district fixed effects (randomization strata), and standard errors are clustered at the unit of randomization (village).

Figure A1: Sierra Leoneon Context

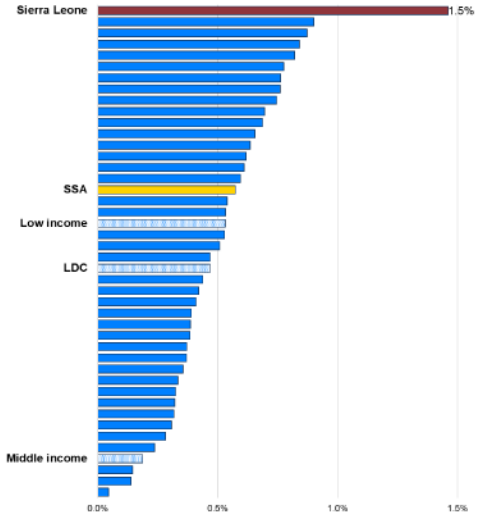
Panel A. Gender Inequality Index 2013



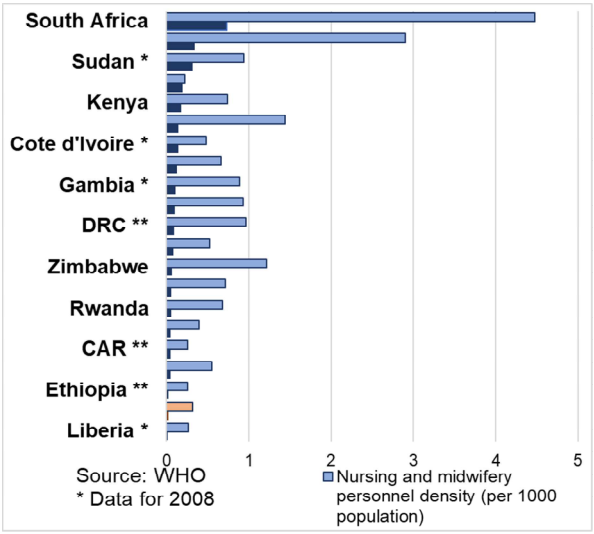
Panel B. Adolescent Fertility Rate, Ages 15-19, 2013 (%)



Panel C. Maternal Mortality Ratio, 2013 (%)



Panel D. Physicians and Nurses per 1,000 population



Notes

Panel A : Source: UNDP. The Gender Inequality Index aggregates information on: maternal mortality rates, adolescent fertility rates, education by gender, female held parliamentary seats, and inequality in labor market participation. The index ranges from 0 to 1, with a value of 0 indicating perfect equality.

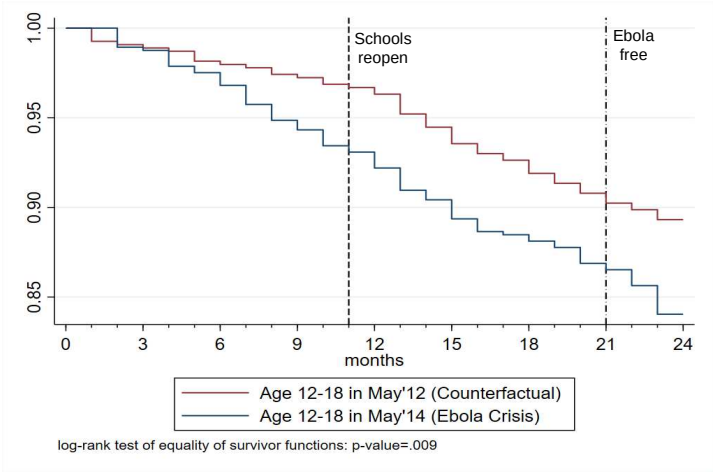
Panel B : Source World Bank WDI

Panel C : Source World Bank WDI, modelled estimates of maternal mortality per 100 live births.

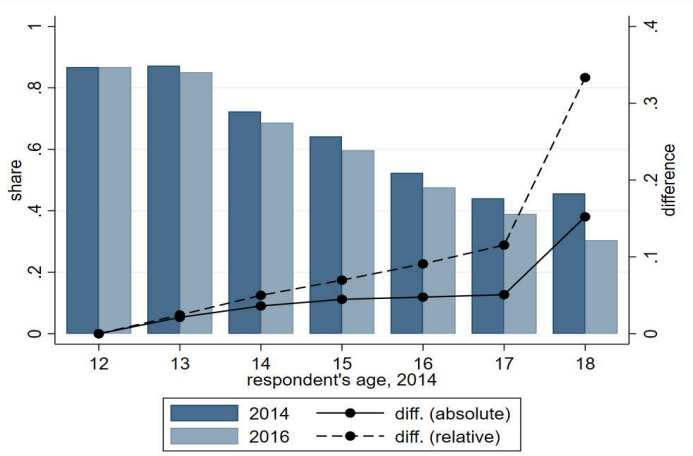
*Panel D : Source WHO, Brighter colored bars represent nurses and the darker bars represent doctors per 1,000 population. * Data for 2008, ** Data for 2009, the remaining data points are for 2010.*

Figure A2: Schooling and Pregnancy Over the Epidemic, SLIHS Data
Kambia, Moyamba, Pujehun and Port Loko Districts

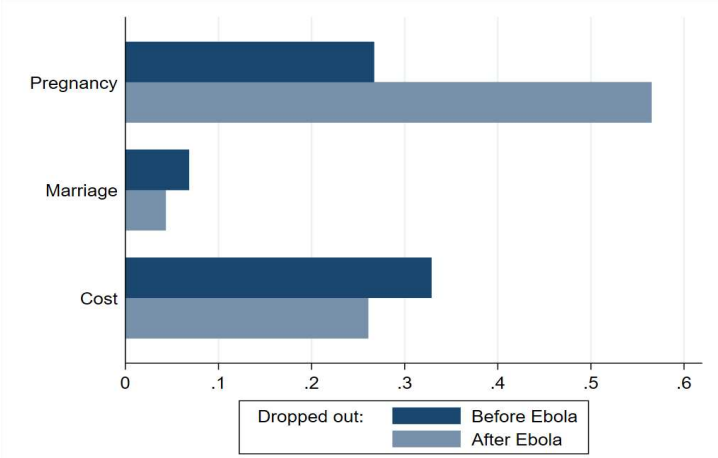
A. Time to Conception, First Pregnancy
Pre and Post-epidemic



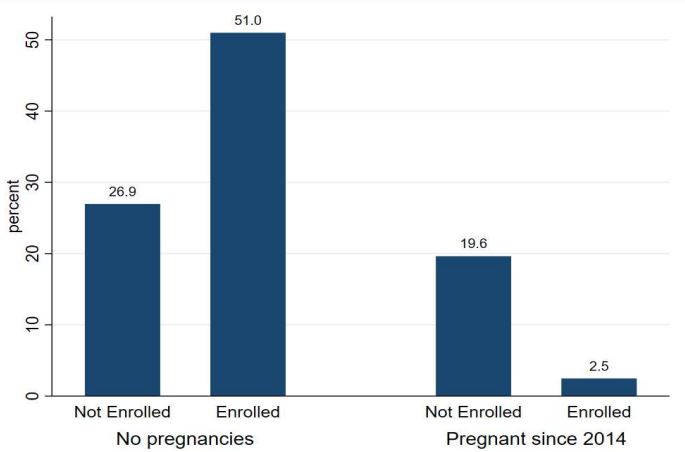
B. School Enrolment Rates, by Age
Girls Aged 12-18 in 2014



C. Reasons for School Dropout by Dropout Date
Pre and Post-epidemic



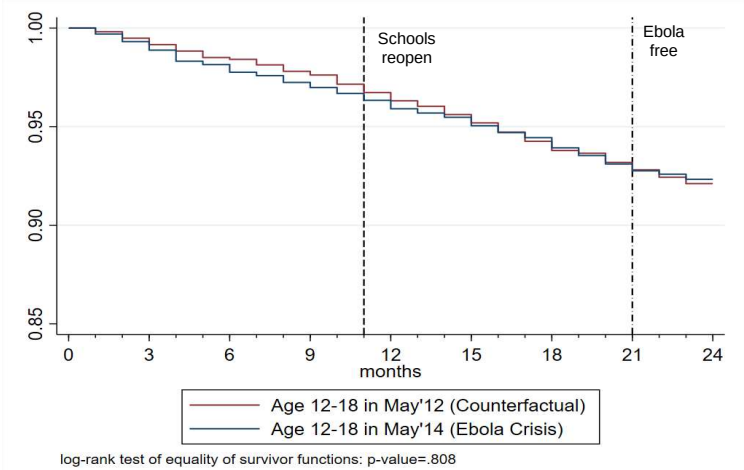
D. Endline Enrolment and Fertility During the Epidemic
Girls Aged 12-18 in 2014



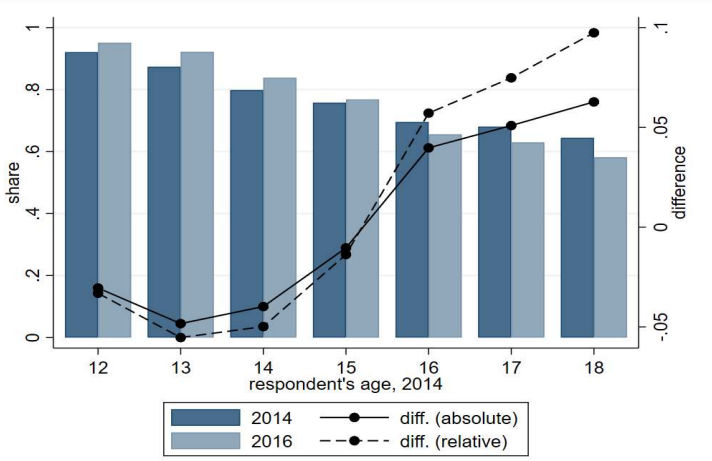
Notes: All panels use data from the Sierra Leone Integrated Household Survey 2018. We use data only from the four districts included in our study: Kambia, Moyamba, Port Loko and Pujehun. Panel A, B and C do not distinguish between urban and rural observations, as this would have resulted in sample sizes that are too small for the type of analysis portrayed. Panel D, instead, focuses on respondents living in rural areas to match our study sample. Panel A depicts Kaplan-Meyer survival functions for respondents aged 12-18 at the beginning of the stated periods (May '12 or May '14) who did not experience any pregnancy before. Respondents' pregnancy histories are used to generate a pseudo-panel with monthly observations where, in keeping with the terminology of survival analysis, each individual's failure variable switches to 1 when the respondent becomes pregnant for the first time. In Panel B, 2014 data refers to answers about school enrolment over the academic year from September 2013 to July 2014 (our baseline survey was collected between February and May 2014), while 2016 enrolment refers to the period between January 2016 and July 2016 (our endline survey was collected between February and May 2016). Panel C reports the incidence of different drop out reasons for the two samples, depending on when the respondent left school. The group that dropped out before Ebola includes respondents age 12-18 in 2014 who were not in school during the period between Sept. 2013 and July 2014. Respondents that attended school during that period, but did not enroll during the period between April 2015 and July 2016 are those labelled as having dropped out after Ebola. The data used comes from question [b25] "Why did you leave school?". The category "Cost" includes the following answers: "too expensive" and "lack of finances".

Figure A3: Schooling and Pregnancy Over the Epidemic, SLIHS Data
Non-study Districts

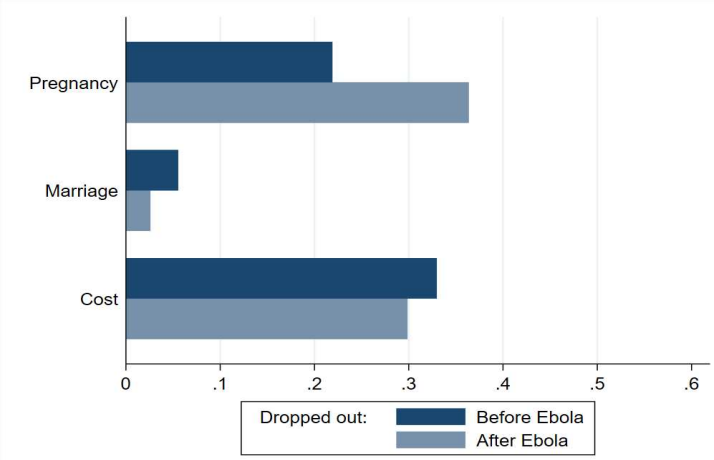
A. Time to Conception, First Pregnancy
Pre and Post-epidemic



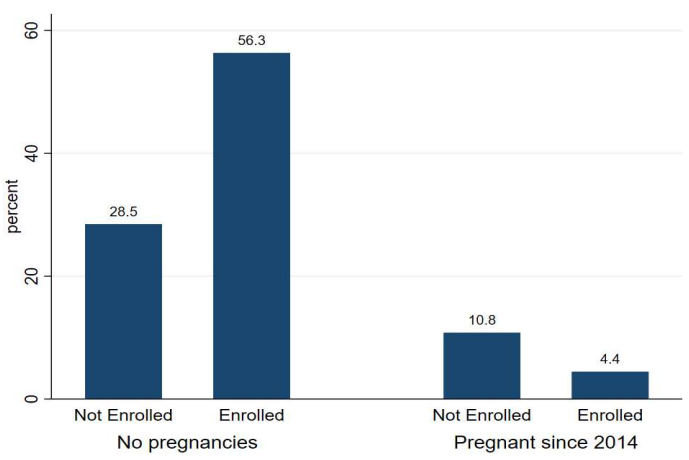
B. School Enrolment Rates, by Age
Girls Aged 12-18 in 2014



C. Reasons for School Dropout by Dropout Date
Pre and Post-epidemic



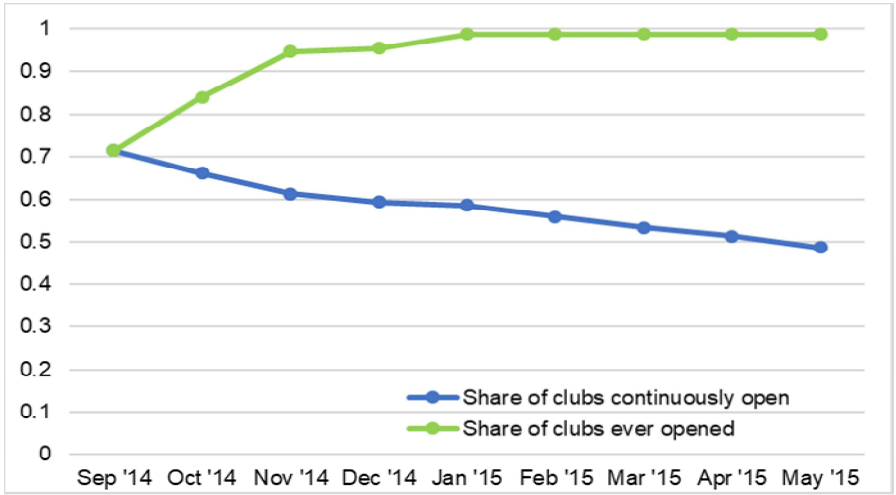
D. Endline Enrolment and Fertility During the Epidemic
Girls Aged 12-18 in 2014



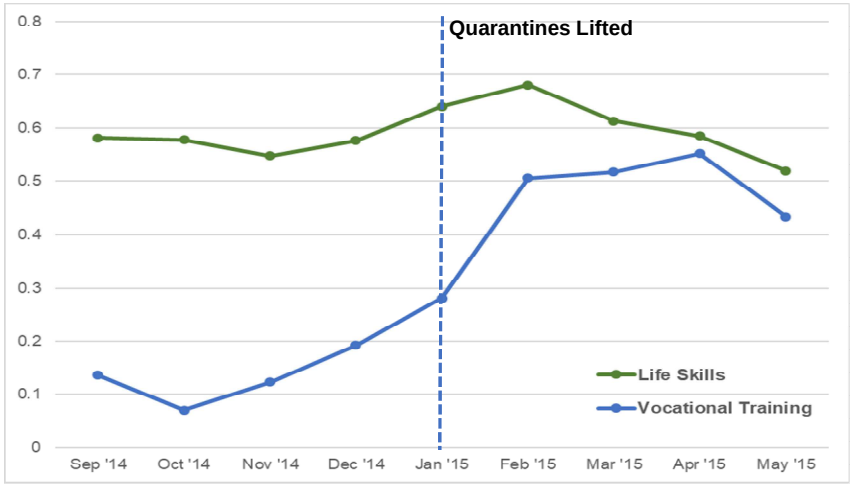
Notes: All panels use data from the Sierra Leone Integrated Household Survey 2018. The sample used for these figures excludes our four study districts, showing results for the rest of the country. Throughout, we make no distinction between rural and urban locations. Panel A depicts Kaplan-Meyer survival functions for respondents aged 12-18 at the beginning of the stated periods (May '12 or May '14) who did not experience any pregnancy before. Respondents' pregnancy histories are used to generate a pseudo-panel with monthly observations where, in keeping with the terminology of survival analysis, each individual's failure variable switches to 1 when the respondent becomes pregnant for the first time. In Panel B, 2014 data refers to answers about school enrolment over the academic year from September 2013 to July 2014 (our baseline survey was collected between February and May 2014), while 2016 enrolment refers to the period between January 2016 and July 2016 (our endline survey was collected between February and May 2016). Panel C reports the incidence of different drop out reasons for the two samples, depending on when the respondent left school. The group that dropped out before Ebola includes respondents age 12-18 in 2014 who were not in school during the period between Sept. 2013 and July 2014. Respondents that attended school during that period, but did not enroll during the period between April 2015 and July 2016 are those labelled as having dropped out after Ebola. The data used comes from question [b25] "Why did you leave school?". The category "Cost" includes the following answers: "too expensive" and "lack of finances".

Figure A4: ELA Implementation

A. Share of ELA Clubs Continuously, Ever Open

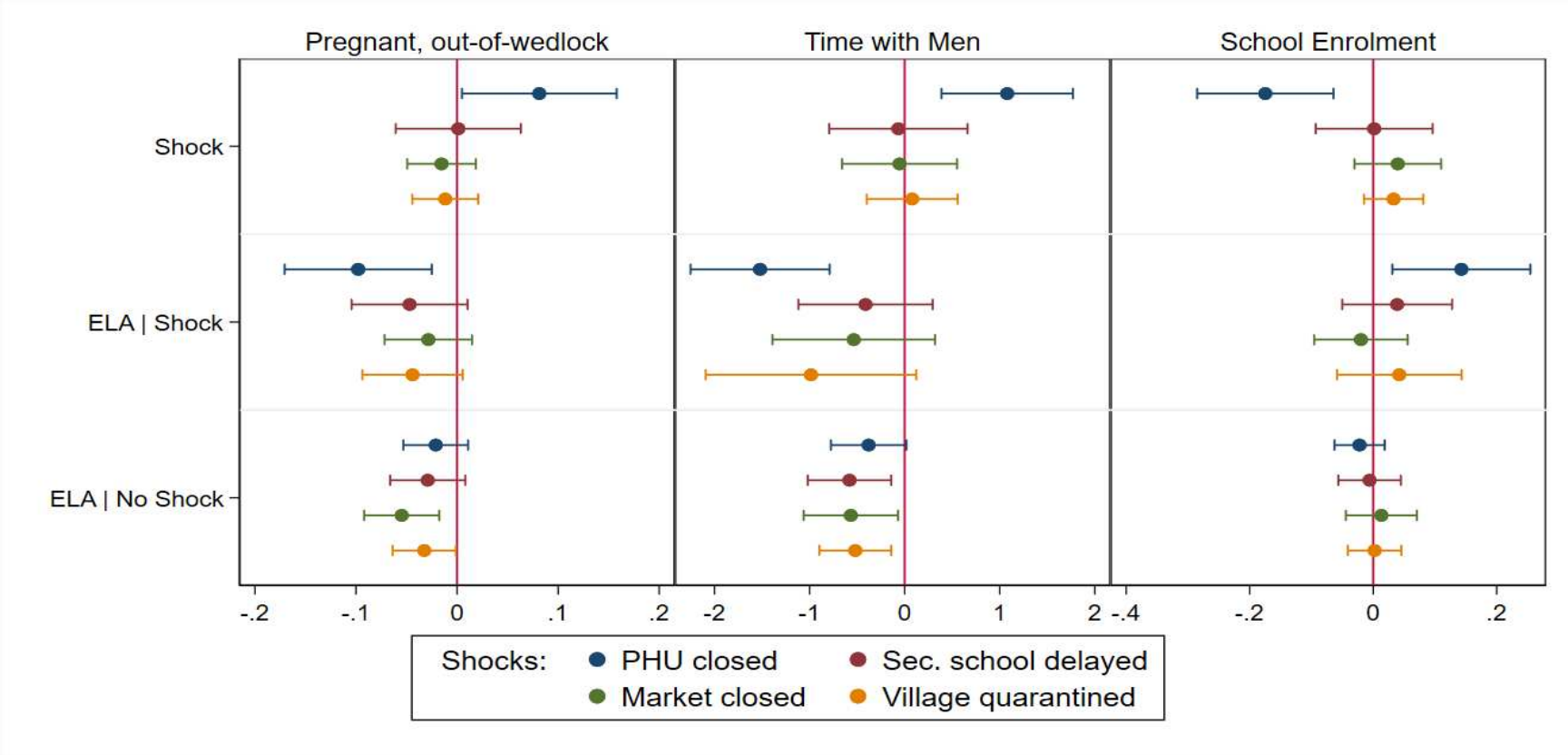


B. ELA Program Delivery



Notes: Both panels report data from the ELA Club Monitoring Survey administered in June and July 2015 to club mentors. In Panel B the shares reported refer to the share of ELA clubs offering a particular program component in that month, conditional on being open and treatment arm assignment.

Figure A5: Other Shocks to Villages During the Epidemic



Notes: The figure depicts coefficients' estimates of the impact of various shocks during the Ebola crisis, together with treatment effects for the ELA program conditional on the incidence of these shocks. Estimates labelled as "PHU closed" correspond to those presented in the main Tables. The other coefficients are estimated in an analogous way, replacing the measure of disruptions with: a dummy equal to one if the re-opening of the closest secondary school after the crisis was delayed, a dummy equal to one if the village day market had to shut down during the crisis, and a dummy equal to one if the village as a whole was quarantined. The figure reports 95% confidence intervals.