# Adult Health Outcomes during War: The Case of Afghanistan

Parlow, Anton

University of Rostock

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Anton Parlow

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*Visiting Assistant Professor, Department of Economics, University of Rostock, Germany, Phone: +49-381-4984471, Email: anton.parlow@uni-rostock.de*

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**Abstract**

In using spatial variations of the conflict experience in Afghanistan, I estimate mortality and health risks for adults, and thus a casual effect of war on these health outcomes. I find limited support that adults are more likely to die in areas more affected by the conflict than others. However, I find pronounced effects on adult health outcomes, e.g. adults are more likely to be sick in the provinces affected by violence. Though, this effect reverses in sign once focusing on women of reproductive age which could be driven by reported improvements in maternal health services in these provinces.

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Keywords: Armed Conflicts, Adult Health, Mortality

JEL-Classification: I12, O12

## 1. Introduction

Armed conflict, like wars, civil wars, and insurgencies weaken already fragile living situations often found in less developed countries and can have devastating effects on health outcomes. Thus, the effects of armed conflicts on health have been in the focus of studies in the field of development economics since the late 2000s (see Justino, Brück and Verwimp 2013 for an overview). However, a majority of the studies focus only on children, the most vulnerable group during armed conflict but less is known about the effect on adult health outcomes, including adult mortality. This may be explained by data restrictions, given most health surveys focus on child health outcomes and along with these, maternal health outcomes at most. Given these data limitations, I attempt to estimate an effect of war on health outcomes for all adults, and in doing so, I want to stimulate future research in this area. Nonetheless, adverse health effects during adulthood affect health outcomes later in life, e.g. the QUALY at old-age, and in the case of mortality, end a life too early in comparison to adults not experiencing adverse health shocks.

Typically, studies estimating the effect of armed conflict on adult health outcomes use household level survey data, like the well known Demographic Health Surveys (DHS) organized by the USAID. The DHS, however, focuses mostly on maternal health, and mortality outcomes for other adults are derived from the sibling questionnaire containing significantly less information. But it is widely known that sibling data have problems on their own and one of them is, that the actual location of that sibling is not known (see Helleringer et al. 2014 for details on other limitations). Thus, accounting for different conflict experiences across regions is not possible. Studies using sibling data focus on sex, wealth or educational differentials in estimating adult mortality rates (e.g. excess mortality) from these sibling data but no mortality differentials between

conflict areas. This can lead to results not representative for all regions and along with this, development aid likely allocated to households less in need compared to other households.

Still, there are a few studies estimating mortality rates for conflict striven countries. Examples for estimating excess mortality rates in conflict areas include the 2003 Iraq invasion (Roberts et al. 2004), for the conflicts in the Republic of Congo, Ethiopia, Rwanda, and Sierra Leone (de Walque and Filmer 2012) and for Afghanistan Rasooly et al. (2014) and Akseer et al. (2016). Though, Rasooly et al. and Akseer et al. focus only on child and maternal mortality. Moreover, these studies do not account for differences in the conflict experience in these countries and typically estimate rates before a conflict broke out and thereafter.

In using variations in the conflict experience to identify an effect of the armed conflict in Afghanistan on adult health outcomes including mortality, I add to the (economic) cost of war literature. Previous work has shown (Parlow 2013, 2016) that accounting for variations matters and that individuals and households are not affected the same during an armed conflict. Furthermore, armed conflict is considered a major threat to public health (Murray et al. 2002).

I utilize the 2010 Afghan Mortality Survey (AMS) and estimate a causal effect of war on adult mortality and adult health. In combining data on conflict events with the location of the household, I am able to estimate an actual effect of the so-called War on Terror on these health outcomes for the period 2007 to 2010.[1] First, I find for some groups that the mortality rates are two percent higher in provinces affected more by the conflict. Second, I find that adults are up to four percent sicker on the average in these provinces, but surprisingly, are

[1]Note, even if the armed conflict in Afghanistan is called War on Terror, it has the characteristics of a war, e.g. more than thousand battle deaths per year, destruction of infrastructure and so on.

less hospitalized in these areas. This may be because of not as severe illnesses, or more likely, because of the fragile security situation, these individuals do not leave their homes. Third, I find that women of reproductive age, are less likely to be sick in the provinces experiencing more violence. Coleman and Lemmon (2011) report that these provinces are specifically targeted by development aid projects and thus the access and distribution of maternal health services improved in these provinces which would explain why women are less sick on the average, despite the higher levels of violence experienced.

My paper is organized as follows. A brief literature follows in section 2. In section 3, I discuss the data, my identification strategy and my empirical model. In section 4, I present my main results and perform robustness checks and further explore the effect of the war in Afghanistan on adult health outcomes. The paper concludes in section 5.

## 2. Related work

The work can broadly summarized in studies computing access mortality rates and trends in mortality directly from small (or nationwide) mortality surveys to estimate maternal mortality or adult mortality with the use of sibling data. The first approach is more typical for the medical (epidemiology) literature, while the latter can be often found in the development economic literature. One advantage in using sibling data is, that the sample size increases on adult mortality. I focus on studies explicitly analysing mortality in conflict regions.

Studies computing excess mortality from actually self-collected household samples can be found for instance in Roberts et. al (2004) and Hagopian et al. (2013). These two studies focus on the time after the US invasion of the Iraq in 2003. In these studies child and adult mortality are calculated based smaller samples. They compute these rates without identifying factors (e.g. drivers) causing mortality. In contrast, and for Afghanistan, Bartlett et al. (2005)

conduct surveys in four districts of Afghanistan and identify factors explaining the differences in mortality rates found between the districts. They find that maternal mortality increases with remoteness, e.g. if households live further away from medical centers and other resources. Finally, there are two studies from the medical literature using nationwide surveys and compute mortality rates and trends for Afghanistan. Rasooly et al. (2014) and Akseer et al. (2016) use the 2010 Afghan Mortality Survey and find that maternal and child mortality trends show a reduction in these mortality outcomes. Still, they assume that the conflict experience is uniform across country and compute overall trends for the entire country.

The other strain of research can be found in the economic development literature. Here, sibling data from demographic health surveys are used to compute mortality rates and trends. De Walque and Filmer (2012) is one of the more prominent examples. They include four conflict-striven African countries to estimate mortality rates and find that especially men in urban areas are more affected by a conflict. A similar approach can be found in Timaeus and Jassee (2004) for a much larger sample of African countries but not all are experiencing conflict during the time frame observed. However, there is no information on exposure to conflict in sibling modules in all of these survey. Thus, it is not possible to identify a pure effect of an armed conflict on mortality and other developments could also be the reason for the results found. This is my main motivation to disentangle the effect of armed conflict and other developments taking place at the same time in using a nationwide survey and to identify factors driving individual mortality.

## 3. Data, descriptive statistics, identification and empirical strategy

### *3.1. Data and descriptive statistics*

I utilize the 2010 Afghanistan Mortality Survey (AMS) for my analysis. The AMS is a comprehensive mortality survey including basic background information on households and individuals living in these households as well as for a subset the cause of death. It also provides basic questions on the health status of people alive. It is nationally representative including all 34 provinces, even the provinces affected highly by violence. More important is, that the provinces were the households live are known, and this information can be combined with data on violent events in Afghanistan. In total, I have 24,000 households in my sample and roughly 180,000 individuals which reduces to 85,000 individuals in adulthood, e.g. if the age group is defined as 18 and higher.

In Table 1, I show basic overall descriptive statistics at the household level and individual level. I already define regions more affected by the violence than others. A discussion of how I identify and define these provinces follows shortly after. A few noteworthy points are already visible in these averages. First, Afghan households have 0.34 total deaths on the average over the period 2007 to 2010. The average for the provinces experiencing high levels of violence is actually lower. Second, the age at death for adults is roughly 58 years and differences between the areas with high levels of violence are marginal. Finally, the areas with higher levels of violence have wealthier households on the average being more able to mitigate the negative effects of war on health. Knowing that Afghanistan is a least developed country (HDR 2015), differences in wealth are usually the endowment of households with basic assets. However, overall averages can mask developments over time and at the province level. Thus, in Figure 1 I show mortality rates per 1000 households for the years 2007 to 2010 and over the provinces in Afghanistan.

Mortality rates do vary across the provinces and over time. Especially for the spatial variation should be accounted for in models estimating the risk of dying and other health outcomes. This cannot be done with sibling mortality data taking from demographic health surveys, because the actual location of the sibling is typically not known.

[Table 1 about here]

[Figure 1 about here]

### *3.2. Identification strategy*

Above I showed that death rates are different across provinces and vary over time. Without showing it here, this is also true for other health outcomes. To actually estimate a causal effect of war on adult health outcomes, I need to identify provinces affected more by violence than others. Previous studies assume that the armed conflict experience is uniform across an entire country, however armed conflicts vary in their intensity spatially and over time. I use event data on violent events to show these variations and base my identification of provinces affected more by violence than others on these event data. I utilize data published by the UN (UNAMA 2016) and USAID (USAID 2016) and visualize civilian victims dead and injured across the provinces and over the years 2007 to 2010 in Figure 2. Violence does vary over time but is also concentrated in some provinces, e.g. Kabul and Kandahar, the provinces with the government present but also US troops (Nato 2016), the proclaimed enemy of the Taliban (Mcnally and Bucala 2015). Insurgents (and terrorist) in general tend to target the facilities of their enemies as well as the local authorities supported by these (Kalvyas 2006). With the underlying event data, I define provinces as high and very high intensity provinces to compare adult health outcomes with provinces

having less or even no incidences of violence at all. Provinces with a high intensity of violence have more than 400 incidences per year, while provinces with very high level levels of violence have more than 1,000 incidences per year.[2]

[Figure 2 about here]

### *3.3. Empirical strategy*

My goal is to estimate a local average treatment effect of the war in Afghanistan on adult health outcomes. These health outcomes include adult mortality and if the adults who are alive, are more sick on the average. To do so, I identify provinces, and therefore households and individuals living in these households, more affected by the war than others. Thus, I can estimate a linear probability difference in difference model in the following and typical fashion to identify adverse effects of exogenous shocks at the individual (Agadjanian and Prata 2002, Finlay 2009, Bertelli 2015):

$$\text{Health}_{ij} = \alpha + \gamma \text{War}_{ij} + \beta_1 \text{X}_{ij} + \beta_2 \text{Household}_{ij} + \tau + \epsilon_{ij} \tag{1}$$

The variable Health is the adult health outcome for individual $i$ living in province $j$. This includes for one set of individuals adult mortality and for another set of individuals if an adult was sick in the last 30 days or hospitalized in the last 12 months at the time the survey was taken. Mortality and being sick, however, do not overlap, e.g. adults who are sick are still alive. Though the majority of adults who died had been actually sick before they died.

My main variable of interest is the War variable and is of binary nature, e.g. it takes the value '1' if individuals live in a province affected more by

[2]This includes the following provinces: Kunduz, Paktia, Paktika, Uruzgan, Hilmand, Zabul, Kunar, Nangahar, Kabul, and Khost as high intensity and Kunar, Kabul, Khost, and Nanga- har as very high intensity.

violence and '0' otherwise. The sign of $\gamma$ can be positive, negative or zero (e.g. insignificant). A positive effect would mean, that the war increases the risk of dying (or being sick), while a negative sign would mean, it reduces the risk of dying (or being) sick. Zero would mean that the war has no significant effect on adult health outcomes.

The vector $X_{ij}$ includes information on the age, sex and education (if available) of the individual while the variable Household includes information on wealth, the remoteness of the household and the number of total deaths in this household before 2007. The variable $\tau$ includes fixed effects at the province level to account for other macroeconomic developments taking place. $\epsilon_{ij}$ is the usual standard error and is clustered at the province level.

## 4. Results

### *4.1. Adult mortality*

My main results can be found in Table 2. I show results for a baseline model and models including the main variable of interest War. In the baseline model I find that there are difference between urban areas and rural areas. Individuals could have a higher risk of experiencing violence in these areas over all provinces in Afghanistan because in urban areas government agencies as well as other typical targets for terrorists can be found. This effect remains significant even after controlling for the provinces experiencing higher levels of violence.

The negative wealth effect is expected, given that wealthier household typically have a better endowment with resources and can cope differently with factors (e.g. diseases, pregnancy) causing adult mortality. In a paper on child mortality in Afghanistan (Parlow 2016), I found that these households have also lower levels of child mortality than poorer households.

At the individual level, I find that there are no mortality differences between male and female individuals. Usually, women have a higher risk of dying because

of maternity, and thus, complications during pregnancy and at birth are the main reason for female mortality. Furthermore, older people have a higher risk of dying as expected. Once including the War dummy, these variables remain similar in sign and significance.

The War variable itself has no effect in the not including province dummies but become significant once these province fixed effects are included. Given that most of the province variables are significant and jointly significant, I find that the war in Afghanistan increases they risk of dying by roughly two percent for the provinces experiencing very high levels of violence. This includes particularly the provinces Kabul, Kandahar and Helmland. The effect itself is smaller in magnitude for individuals in provinces experiencing high level of violence. However, the effect itself is not very high in magnitude overall. This could be because households have got used to the constant level of violence and along with this, the extremely low level of development in Afghanistan. Nonetheless, they had time to learn how to cope for more than 30 years (e.g. through consumption smoothing), and have very likely developed coping strategies mitigating the possibly negative effects of daily hardships (Rose 1999, Bove and Gavrilova 2014).

To further explore the effect of the war, I test if households from different wealth quintiles do actually cope differently with the war experience itself. In Table 3, I show the results by wealth quintiles and focus only on the war effect itself. I do find that the above results are mainly driven by poor households typical less able to cope with additional strains on their daily lives.

[Table 2 about here]

[Table 3 about here]

*4.2. Adult health outcomes*

In this section I explore two health outcomes related to the conflict experience. The first health outcome is if adults are more likely to be sick in the 30 days before the survey was taken. The second health outcome is if individuals are more likely to be hospitalized (e.g. an overnight stay at a health facility) in the 12 months prior to the survey.

In Table 4 and Table 5, I include the same control variables as in my mortality estimations, however the sample changes to individuals actually being alive. I find that individuals in urban areas are sicker compared to individuals living in rural areas. Similarly to above, I find that older people are sicker on the average but there is a significant sex differential in this particular health outcome, e.g. women are more likely to be sick. The highest risk for women to get sick, is still pregnancy and related complications. This is also the reason why I find that women are more likely to be hospitalized. However, the actual effect of the war on these outcomes move in opposite directions when comparing being sick and being hospitalized.

For being sick, I find a significant and positive effect of the war. Individuals living in these areas are sicker on the average. The magnitude is higher compared adult to mortality (four percent versus two percent) and more robust, especially for provinces with very high level of violence. But the sign for being hospitalized changes completely and this is surprising, however can be explained by the higher risk of being exposed to violence in these areas. Individuals who are severely sick and need to go to a medical facility, have a potential higher risk of becoming a victim of the war. First, they need to go to the facility (or being transported) and can be a target for terrorists. Second, hospitals are quite often used by terrorists (and insurgents) as a hide-out and thus may be a target of government forces, or even a target for terrorist themselves, as agencies of a

government who is the proclaimed enemy. This can explain why individuals are less hospitalized although they are more likely to be sick in these provinces.

[Table 4 about here]

[Table 5 about here]

*4.3. Robustness checks*

There could be a few issues with data from conflict regions threatening the validity of the results found above. Typically, household members migrate because of an armed conflict and that could change the composition of the household, e.g. weaker and sicker members stay behind. Another issue could be that the data quality is low if the level of violence is too high in a region and it is not safe to conduct interviews there. Furthermore, omitted variable bias could be an issue because of the lack of information in the data set, for instance education is missing above, a main predictor for health outcomes. However, it is not always possible to account for all these issues.

First, the issues of migration (e.g. forced displacement) would change the group of individuals I compare the health outcomes to. Given that since 2005 almost 26 percent of the household had at least one member leaving, this could mean that the healthier and very likely younger ones left the household, and thus the war effect I found above, could overstate the true effect of war on adult health outcomes, because the comparison group may be unhealthier to begin with.

Second, data concerns can be an issue, e.g. if it is too unsafe to conduct interviews in certain areas, interviewers may fill out questionnaires and turn in these fraudulent questionnaires. Hill (2012) argues this may be an issue for the South of Afghanistan. However, in comparison with other provinces the South

is actually not the part of Afghanistan affected the most by violence. The areas actually highly affected by the war, are Kabul, Kandahar and Helmland. Still, I account for this possible issue and exclude provinces located in the southern region of Afghanistan. In Table 6 I show the results. I find similar results for the adult health outcomes as before. However, they are stronger in magnitude which can be explained by excluding provinces actually not as affected by violence as other provinces in the control group.

[Table 6 about here]

Finally, I turn to the issue of omitted variable bias. Usually, health outcomes can be explained by the level of education an individual has, e.g. more educated individuals live healthier. However, this information is unfortunately only available for dead individuals and if alive, only part of the women questionnaire. Thus, I can only use it for women and this reduces my sample size drastically. Furthermore, the level of education for women is extremely low in Afghanistan because of the suppressive rule of the Taliban from the early 90s to the US invasion in 2002. This means most women have almost no education and if they have education roughly one year of formal school training at most. Still, I test the role of education and additionally information in Table 7 on the adult outcome being sick in the last 30 days.[3] Surprisingly, even the low levels of education have a negative effect on being sick. Furthermore, for this sample of adults I find that the effect of war reverses in sign in the province fixed effects regressions. Women are less sick on average in the provinces affected the most by violence. This could be, because in these provinces a higher influx of development aid is present typically targeting pregnant women and women

[3]There is no question on being hospitalized in the women questionnaire. Though, roughly 50 percent of the individuals who can be found in the outpatient questionnaire are female.

and their young children (Coleman and Lemmon 2011, Carvalho, Salehi, and Goldie 2013). Here, more pregnant women are present than in provinces with lower levels of violence. Coleman and Lemmon also report that maternal health has been improving in Afghanistan especially in these provinces. I also found (Parlow 2016) that levels of child mortality are lower in the provinces for the above reason and child mortality, especially, postnatal mortality, is linked to improvements in maternal health.

[Table 7 about here]

## 5. Conclusion

Adult health outcomes in countries experiencing armed conflict (e.g mostly developing countries) is typically defined as adult mortality. If other health outcomes are studied, the focus is only on maternal health, e.g. a group exposed to higher risks of getting sick (or die). However, adults are not only women. Thus, I focus on all adults, male and female, and estimate a causal effect of the war in Afghanistan on adult mortality and if adults are more likely to be sick. In accounting for differences in the conflict experiences across the provinces, I do not assume the conflict experience is uniform, as studies on sibling mortality typically do because of data restrictions. Here, I am able to give a finer picture of how an armed conflict can affect adult health outcomes. I find that adult mortality is only higher in provinces experiencing very high levels of violence. Furthermore, I find that adults are more likely to be sick but in contrast, less likely to go to hospitals when they are sick because of security concerns. Targeted development aid should assist individuals in areas with higher levels of violence to mitigate the likely negative effects of armed conflict. In general, a more diverse picture of mortality and health outcomes

in conflict regions is needed to design security and development policies better. Future research should add to this discussion because developments at the micro (e.g. household) level are more helpful in designing targeted aid, than overall macro (e.g. country) level developments.

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## Figures

Figure 1: Adult mortality per 1000 households - 2007 to 2010

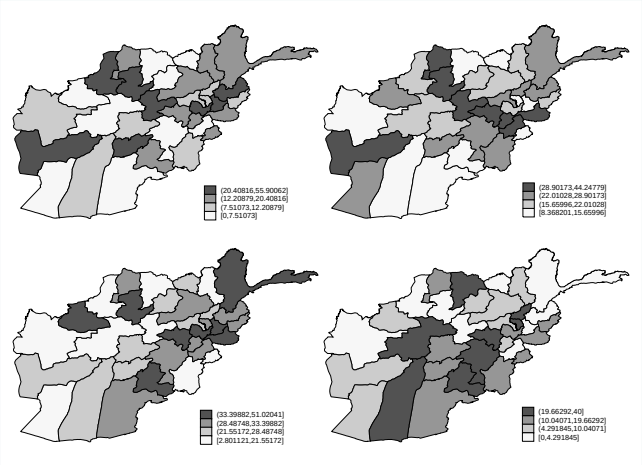
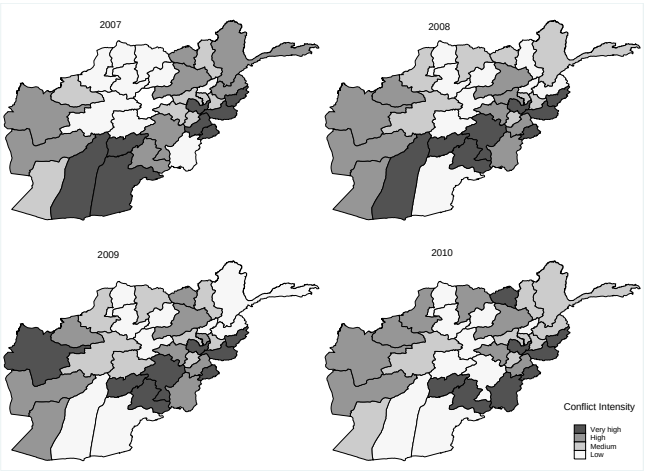



Figure 2: Civilians dead and injured across provinces - 2007 to 2010



## Tables

Table 1: Descriptive statistics - AMS 2010

| | All | Low intensity | High intensity |
|---|---|---|---|
| **Household Level** | | | |
| Total deaths | 0.34 | 0.31 | 0.30 |
| Wealth score | -259.99 | 46834.17 | 62058.08 |
| Urban | 31.26 % | 25.88 % | 38.52 % |
| Unprotected water source | 23.08% | 24.02% | 19.46% |
| Electricity | 48.12% | 51.48% | 43.59% |
| Refrigerator | 11.85% | 11.41% | 12.41% |
| **Individual Level** | | | |
| Age at death (all) | 28.56 | 29.00 | 30.00 |
| Age at death (adults) | 57.37 | 57.67 | 58.44 |
| **Women only** | | | |
| No education | 73.33% | 72.20 % | 74.85 % |
| Married | 54.05% | 54.90 % | 52.90% |
| Sick in last 30 days | 0.20 | 0.21 | 0.22 |
| Currently pregnant | 18.07 % | 16.67 % | 20.02 % |

Intensity refers to the number of civilians dead in a province. I sum these provinces up to low and high intensity regions. Provinces with a high intensity of violence have more than 400 incidences per year, while provinces with very high level levels of violence have more than 1,000 incidences per year.

Table 2: Individual level estimations

| Variables | Baseline | High intensity | f.e. | Very high intensity | f.e. |
|---|---|---|---|---|---|
| War | | -.0003 | .007*** | .0005 | .0241*** |
| | | ( .0024) | ( .0011) | (.0026) | ( .0014) |
| Total deaths | .0871*** | .0871*** | .0873*** | .0871*** | .0873*** |
| | (.0037) | (.0037) | ( .0037) | (.0037) | ( .0037) |
| Urban | .0036 | .0036 | .0011 | .0036 | .0011 |
| | ( .0024) | (.0025) | (.0015) | (.0025) | (.0015) |
| Wealth | -.0013 | -.0012 | -.0011* | -.0013* | -.0011* |
| | ( .0008) | (.0008) | ( .0006) | ( .0007) | ( .0006) |
| Remoteness | .0005 | .0005 | .0000 | .0004 | .0000 |
| | ( .0006) | ( .0006) | ( .0004) | ( .0006) | ( .0004) |
| Age | .0024*** | .0024*** | .0024*** | .0024*** | .0024*** |
| | ( .0001) | ( .00012) | (.0001) | (.0001) | ( .0001) |
| Sex | -.0018 | -.0018 | -.0018 | -.0018 | -.0018 |
| | ( .0016) | (.0016) | (.0016) | ( .0016) | ( .0016) |
| Fixed Effects | no | no | yes | no | yes |
| Constant | yes | yes | yes | yes | yes |
| N | 85777 | 85777 | 85777 | 85777 | 85777 |
| $R^2$ | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |

*** significant at the 1 % level, ** 5 % level and * % level. I use clustered standard errors. The clusters are at the province level. Adults are 18 years old and older.

Table 3: Death rates at the individual level by wealth quintiles

| Wealth | Poorest | Poorer | Middle | Richer | Richest |
|---|---|---|---|---|---|
| High intensity | .0011 | .0006 | .0024 | .0006 | -.0022 |
| $R^2$ | 0.13 | 0.15 | 0.13 | 0.13 | 0.14 |
| Very high intensity | .0047 | .0098*** | .0037 | -.0003 | -.0010 |
| $R^2$ | 0.13 | 0.15 | 0.13 | 0.13 | 0.14 |
| N | 13628 | 14521 | 15441 | 17238 | 24949 |

Notes: Standard errors are clustered at the province level and are shown in parentheses. Adults are 18 years old and older.
Significance * p<0.10, ** p<0.05, *** p<0.01

Table 4: Individual level estimations sick in last 30 days

| Variables | Baseline | High intensity | f.e. | Very high intensity | f.e. |
|---|---|---|---|---|---|
| War | | .0241 | -.0737*** | .0425* | .0390*** |
| | | (.0265) | (.0089) | (.0222) | ( .0045) |
| Urban | .0224 | .0513*** | .0164* | .0503*** | .0164* |
| | ( .0150) | ( .0144) | ( .0093) | ( .0129) | (.0093) |
| Wealth | .0078* | -.0010 | .0019 | -.0026 | .0019 |
| | ( .0043) | (.0047) | ( .0038) | ( .0044) | ( .0038) |
| Remoteness | -.0042 | -.0022 | .0002 | -.0032 | .0002 |
| | (.0042) | ( .0055) | ( .0027) | ( .0057) | ( .0027) |
| Age | .0029*** | .0041*** | .0040*** | .0041*** | .0040*** |
| | ( .00028) | ( .0003) | ( .0003) | (.0003) | ( .0003) |
| Sex | .0643*** | .1405*** | .1395 | .1406*** | .1395*** |
| | (.0045) | ( .0093) | ( .0093) | (.0093) | (.0093) |
| Fixed Effects | no | no | yes | no | yes |
| Constant | yes | yes | yes | yes | yes |
| N | 179367 | 82205 | 82205 | 82205 | 82205 |
| $R^2$ | 0.02 | 0.04 | 0.06 | 0.04 | 0.06 |

*** significant at the 1 % level, ** 5 % level and * % level. I use clustered standard errors. The cluster are at the province level. Adults are 18 years old and older.

Table 5: Overnight stay at a medical facility in the last 12 months

| Variables | Baseline | High intensity | f.e. | Very high intensity | f.e. |
|---|---|---|---|---|---|
| War | | -.0105 | -.0308*** | -.0105 | -.0308*** |
| | | (.0106) | ( .0076) | (.0106) | (.0076) |
| Urban | .0175*** | .0198** | .0167*** | .0198** | .0167*** |
| | ( .0049) | ( .0073) | ( .0056) | ( .0073) | ( .0056) |
| Wealth | -.0016 | -.0006 | -.0002 | -.0006 | -.0002 |
| | ( .0020) | (.0029) | ( .0020) | (.0029) | (.0020) |
| Remoteness | -.0010 | -.0008 | -.0002 | -.0008 | -.0002 |
| | ( .0016) | (.0021) | (.0018) | (.0021) | ( .0018) |
| Age | .0010*** | .0009*** | .0009*** | .0009*** | .0009*** |
| | ( .0000) | (.0001) | (.0002) | (.0001) | (.0002) |
| Female | .0021 | .0102** | .0124** | .0102** | .0124** |
| | ( .0034) | (.0050) | ( .0048) | (.0050) | (.0048) |
| Number of Deaths | .0151 | .0214 | .0215*** | .0214*** | .0215*** |
| | ( .0029) | ( .0043) | (.0042) | ( .0043) | ( .0042) |
| Fixed Effects | no | no | yes | no | yes |
| Constant | yes | yes | yes | yes | yes |
| N | 35977 | 20461 | 20461 | 20461 | 20461 |
| $R^2$ | 0.01 | 0.01 | 0.01 | 0.01 | 0.04 |

*** significant at the 1 % level, ** 5 % level and * % level. I use clustered standard errors. The clusters are at the province level. Adults are 18 years old and older. Note that because of a change in the sample composition, the high and very high intensity a virtually the same.

Table 6: Robustness check: Excluding the South region

| Variables | All regions | | | | Without South | | | |
|---|---|---|---|---|---|---|---|---|
| | High Intensity | f.e. | Very high | f.e. | High Intensity | f.e. | Very high | f.e. |
| Death | -.0003 | .0077*** | .0005 | .0241*** | .0031 | .0243*** | .0038* | .0243*** |
| N | 85777 | 85777 | 85777 | 85777 | 68452 | 68452 | 68452 | 68452 |
| $R^2$ | 0.13 | 0.13 | 0.13 | 0.13 | 0.14 | 0.14 | 0.14 | 0.14 |
| Sick | .0241 | -.0737*** | .0425 | .0390*** | .0123 | -.0494*** | .0267 | -.0494*** |
| N | 82205 | 82205 | 82205 | 82205 | 65598 | 65598 | 65598 | 65598 |
| $R^2$ | 0.04 | 0.06 | 0.05 | 0.06 | 0.04 | 0.05 | 0.04 | 0.04 |
| Hospitalized | -.0105 | -.0479*** | .0090 | -.0308*** | -.0079 | -.0292*** | .0051 | -.0129 |
| N | 20461 | 20461 | 20461 | 20461 | 17265 | 17265 | 17265 | 17265 |
| $R^2$ | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |

*** significant at the 1 % level, ** 5 % level and * % level. I use clustered standard errors. The clusters are at the province level. Note, that because of excluding certain provinces from the models, the high intensity and very high intensity models including provinces dummies yield the same results for mortality and being sick.

Table 7: Robustness Check: Role of education - sick in last 30 days - women only

| Variables | Baseline | High intensity | f.e. | Very high intensity | f.e. |
|---|---|---|---|---|---|
| War | | .0123 | -.0868*** | .0211 | -.0868** |
| | | (.0341) | (.0159) | ( .0298) | ( .0159) |
| Urban | .0678*** | .0694*** | .0104 | .0693*** | .0104 |
| | ( .0235) | ( .0234) | ( .0160) | (.0222) | ( .0160) |
| Wealth | -.0098 | -.0119 | .0010 | -.0126* | .0010 |
| | ( .0076) | ( .0072) | (.0069) | ( .0069) | ( .0069) |
| Remoteness | -.0045 | -.0045 | .0005 | -.0050 | .0005 |
| | ( .0078) | ( .0078) | (.0040) | (.0082) | (.0040) |
| Age | .0035*** | .0035*** | .0036*** | .0035*** | .0036*** |
| | ( .0009) | ( .0009) | (.0007) | ( .0009) | (.0007) |
| Education | -.0099 | -.0089 | -.0193* | -.0103 | -.0193* |
| | ( .0145) | ( .0129) | ( .0096) | ( .0150) | ( .0096) |
| Married | -.0154 | -.0152 | .0043 | –.0149 | .0043 |
| | ( .0230) | ( .0225) | ( .0200) | (.0224) | (.0200) |
| Children | .0100*** | .0098*** | .0108*** | .0096*** | .0108*** |
| | ( .0032) | (.0028) | (.0022) | ( .0029) | (.0022) |
| Fixed Effects | no | no | yes | no | yes |
| Constant | yes | yes | yes | yes | yes |
| N | 23354 | 23354 | 23354 | 23354 | 23354 |
| $R^2$ | 0.01 | 0.01 | 0.04 | 0.01 | 0.04 |

*** significant at the 1 % level, ** 5 % level and * % level. I use clustered standard errors. The clusters are at the province level. Note that because of a change in the sample composition, the high and very high intensity a virtually the same.

## Appendix A. Underlying data for the GIS maps

Table A1: Incidences of Violence

| **Province** | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| Badakhshan | 51 | 97 | 86 | 125 |
| Badghis | 4 | 153 | 258 | 383 |
| Baghlan | 59 | 215 | 244 | 368 |
| Balkh | 0 | 123 | 128 | 268 |
| Bamyan | 0 | 62 | 59 | 34 |
| Daykundi | 0 | 44 | 98 | 70 |
| Farah | 81 | 210 | 257 | 356 |
| Faryab | 0 | 97 | 203 | 353 |
| Ghazni | 83 | 431 | 547 | 1,178 |
| Ghor | 3 | 84 | 110 | 133 |
| Hilmand | 668 | 972 | 1,240 | 2,498 |
| Hirat | 40 | 232 | 371 | 496 |
| Jawzjan | 0 | 44 | 74 | 71 |
| Kabul | 342 | 618 | 865 | 539 |
| Kandahar | 393 | 1,746 | 2,151 | 2,512 |
| Kapisa | 17 | 129 | 325 | 168 |
| Khost | 215 | 624 | 710 | 876 |
| Kunar | 198 | 479 | 580 | 725 |
| Kunduz | 45 | 144 | 343 | 674 |
| Laghman | 37 | 135 | 172 | 110 |
| Logar | 26 | 148 | 187 | 256 |
| Maydan Wardak | 25 | 242 | 311 | 417 |
| Nangarhar | 121 | 563 | 682 | 862 |
| Nimroz | 12 | 330 | 249 | 246 |
| Nuristan | 45 | 65 | 64 | 108 |
| Paktika | 0 | 283 | 345 | 619 |
| Paktya | 240 | 264 | 266 | 513 |
| Panjsher | 0 | 1 | 8 | 5 |
| Parwan | 14 | 203 | 143 | 100 |
| Samangan | 0 | 20 | 12 | 18 |
| Sari Pul | 0 | 8 | 22 | 49 |
| Takhar | 16 | 52 | 103 | 256 |
| Uruzgan | 210 | 360 | 544 | 524 |
| Zabul | 81 | 511 | 528 | 622 |
| **Sum** | 3,026 | 7,945 | 8,897 | 10,350 |

Base for the GIS map in the text. Sources are the UNAMA 2007 to 2010 reports and USAID (2016).

Table A2: Crude mortality rate at the household level - per 1000

| **Province** | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| Badakhshan | 12,33299075 | 10,27749229 | 15,41623844 | 10,27749229 |
| Badghis | 15,91511936 | 15,91511936 | 7,957559682 | 7,957559682 |
| Baghlan | 6,743737958 | 28,9017341 | 30,82851638 | 20,23121387 |
| Balkh | 15,54404145 | 36,26943005 | 28,49740933 | 9,715025907 |
| Bamyan | 4,310344828 | 21,55172414 | 21,55172414 | 21,55172414 |
| Daykundi | 22,64150943 | 26,41509434 | 30,18867925 | 3,773584906 |
| Farah | 17,4563591 | 37,40648379 | 34,9127182 | 34,9127182 |
| Faryab | 0 | 16,42935378 | 28,47754655 | 8,762322015 |
| Ghazni | 11,54529307 | 8,880994671 | 23,97868561 | 30,19538188 |
| Ghor | 5,882352941 | 25,49019608 | 13,7254902 | 9,803921569 |
| Hilmand | 55,90062112 | 31,05590062 | 43,47826087 | 0 |
| Hirat | 21,19460501 | 25,04816956 | 24,4059088 | 10,91843288 |
| Jawzjan | 10,34482759 | 22,4137931 | 24,13793103 | 5,172413793 |
| Kabul | 18,89814222 | 28,18705958 | 33,632287 | 3,523382447 |
| Kandahar | 10,08064516 | 24,19354839 | 28,22580645 | 30,24193548 |
| Kapisa | 0 | 22,02643172 | 39,64757709 | 4,405286344 |
| Khost | 26,39296188 | 21,9941349 | 33,72434018 | 16,12903226 |
| Kunar | 7,02247191 | 11,23595506 | 30,8988764 | 19,66292135 |
| Kunduz | 7,510729614 | 11,80257511 | 22,53218884 | 4,291845494 |
| Laghman | 32,46753247 | 32,46753247 | 28,13852814 | 6,493506494 |
| Logar | 22,12389381 | 44,24778761 | 13,27433628 | 0 |
| Maydan Wardak | 0 | 8,571428571 | 2,857142857 | 40 |
| Nangarhar | 9,105516872 | 20,3535083 | 23,0316015 | 18,74665238 |
| Nimroz | 20,40816327 | 10,20408163 | 51,02040816 | 20,40816327 |
| Nuristan | 8,368200837 | 8,368200837 | 29,28870293 | 20,92050209 |
| Paktika | 8,403361345 | 8,403361345 | 2,801120448 | 2,801120448 |
| Paktya | 16,3132137 | 40,78303426 | 30,99510604 | 11,41924959 |
| Panjsher | 31,57894737 | 21,05263158 | 21,05263158 | 0 |
| Parwan | 15,71709234 | 17,68172888 | 33,39882122 | 7,858546169 |
| Samangan | 33,55704698 | 15,65995526 | 38,03131991 | 2,237136465 |
| Sari Pul | 19,13043478 | 33,04347826 | 34,7826087 | 10,43478261 |
| Takhar | 9,661835749 | 16,42512077 | 28,98550725 | 19,3236715 |
| Uruzgan | 12,08459215 | 27,19033233 | 9,063444109 | 15,10574018 |
| Zabul | 0 | 30,3030303 | 30,3030303 | 0 |

Base for the GIS map in the text. Sources are the UNAMA 2007 to 2010 reports and USAID (2016). Note, that for the year 2010 the survey was taken until mid 2010, e.g. the 2010 rates may overestimate actual deaths or underestimate deaths for that year, depending on the timing of the interview.