

Kenya Uptake Descriptive Analysis

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```
#-----  
# uptake.R  
#  
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#  
# summarize measures of uptake / compliance  
# by study arm and measurement round  
# (enrollment, year 1, year 2)  
#-----  
  
#-----  
# input files:  
#   washb-kenya-uptake.csv  
#  
# output files:  
#   kenya-uptake.RData  
#  
#-----  
  
#-----  
# preamble  
#-----  
rm(list=ls())  
try(detach(package:plyr))  
library(dplyr)  
  
## Warning: package 'dplyr' was built under R version 3.2.5  
  
library(washb)  
library(foreign)  
  
#wrapper function to call washb_mean  
mean.est <- function(Y,tr,svy,id,group="Control",s=0,print=FALSE) {  
  # Y : outcome variable  
  # tr: treatment indicator variable  
  # svy : measurment round variable  
  # id: cluster ID variable  
  # group : string. treatment factor level to compute mean  
  # s      : survey round to compute mean. 0, 1, or 2  
  require(washb)  
  dat <- data.frame(id=id[tr==group & svy==s],  
                    svy=svy[tr==group & svy==s],  
                    Y=Y[tr==group & svy==s],  
                    tr=tr[tr==group & svy==s])
```

```

dat <- dat[complete.cases(dat),]
fit <- washb_mean(Y=dat$Y,
                  id=dat$id,
                  print=F
                  )
if(print==TRUE) print(fit)
res<-fit[c(2,5,6)]
names(res) <- c("mean","ci.lb","ci.ub")
return(res)
}

```

```

#-----
# load the uptake analysis dataset
#-----
setwd("C:/Users/andre/Dropbox/WBK-primary-analysis/Data/Final/Andrew")
#d <- read.csv("washb-kenya-uptake.csv")
d <- read.dta("washb-kenya-uptake.dta")

```

```

#create 2 empty rows to add for midline and endline passive control, so empty columns get added to the
d[(nrow(d)+1),]<-rep(NA,ncol(d))
d[(nrow(d)+1),]<-rep(NA,ncol(d))
d[(nrow(d)-1),4]<-"Passive Control"
d[(nrow(d)),4]<-"Passive Control"
d[(nrow(d)-1),"studyyear"]<-1
d[(nrow(d)),"studyyear"]<-2
tail(d)

```

```

##          hhid clusterid block          tr promoter_vis freechl
## 21399 7913111      47008    68          Control            0      NA
## 21400 7913121      47008    68          Control           NA       0
## 21401 7913121      47008    68          Control            1       0
## 21402 7913121      47008    68          Control            0       0
## 21403      NA         NA    NA Passive Control          NA      NA
## 21404      NA         NA    NA Passive Control          NA      NA
##      impr_lat ch_feces_safe_disp watsoap_avail studyyear  lnsn lnsn
## 21399      0              0              0          2    NA   NA
## 21400     NA              0              0          0    NA   NA
## 21401      0              1              0          1    NA   NA
## 21402     NA              0              0          2    NA   NA
## 21403     NA             NA             NA          1    NA   NA
## 21404     NA             NA             NA          2    NA   NA
##          svydate
## 21399 2016-07-01
## 21400      <NA>
## 21401 2015-05-22
## 21402 2016-07-01
## 21403      <NA>
## 21404      <NA>

```

```

# re-order the treatment factor for convenience
d$tr <- factor(d$tr,levels=c("Control","Passive Control","Water","Sanitation","Handwashing","WSH","Nutr

#-----
# for each uptake indicator, summarize
# the number of obs and the % at each
# measurement round
#-----

d.svy <- group_by(d, tr,studyyear)

# promoter visit
promoter_vis <- summarise(d.svy,n=sum(!is.na(promoter_vis)),count=sum(promoter_vis,na.rm=T),mean=mean(p
print(promoter_vis, n=24)

```

```

## Source: local data frame [24 x 5]
## Groups: tr [?]
##
##           tr studyyear      n count      mean
##           <fctr>    <dbl> <int> <int>    <dbl>
## 1      Control         0     0     0      NaN
## 2      Control         1   980   666 0.6795918
## 3      Control         2  1412   492 0.3484419
## 4 Passive Control     0     0     0      NaN
## 5 Passive Control     1     0     0      NaN
## 6 Passive Control     2     0     0      NaN
## 7      Water          0     0     0      NaN
## 8      Water          1   445   338 0.7595506
## 9      Water          2   680   255 0.3750000
## 10 Sanitation         0     0     0      NaN
## 11 Sanitation         1   445   333 0.7483146
## 12 Sanitation         2   692   278 0.4017341
## 13 Handwashing        0     0     0      NaN
## 14 Handwashing        1   480   333 0.6937500
## 15 Handwashing        2   678   228 0.3362832
## 16      WSH           0     0     0      NaN
## 17      WSH           1   512   386 0.7539062
## 18      WSH           2   649   241 0.3713405
## 19 Nutrition          0     0     0      NaN
## 20 Nutrition          1   433   344 0.7944573
## 21 Nutrition          2   635   251 0.3952756
## 22 Nutrition + WSH    0     0     0      NaN
## 23 Nutrition + WSH    1   474   388 0.8185654
## 24 Nutrition + WSH    2   710   259 0.3647887

```

```

# store water with detectable chlorine
freechl <- summarise(d.svy,n=sum(!is.na(freechl)),count=sum(freechl,na.rm=T),mean=mean(freechl,na.rm=T)
print(freechl, n=24)

```

```

## Source: local data frame [24 x 5]
## Groups: tr [?]

```

```
##
##          tr studyyear      n count      mean
##          <fctr>      <dbl> <int> <int>      <dbl>
## 1      Control          0 1529   44 0.02877698
## 2      Control          1  847   25 0.02951594
## 3      Control          2 1365   38 0.02783883
## 4 Passive Control          0  736   24 0.03260870
## 5 Passive Control          1    0    0      NaN
## 6 Passive Control          2    0    0      NaN
## 7          Water          0  720   20 0.02777778
## 8          Water          1  385  151 0.39220779
## 9          Water          2  637  144 0.22605965
## 10     Sanitation          0  715   20 0.02797203
## 11     Sanitation          1  367   18 0.04904632
## 12     Sanitation          2  641   17 0.02652106
## 13 Handwashing          0  743   30 0.04037685
## 14 Handwashing          1  417   20 0.04796163
## 15 Handwashing          2  648   16 0.02469136
## 16          WSH          0  711   29 0.04078762
## 17          WSH          1  424  180 0.42452830
## 18          WSH          2  598  112 0.18729097
## 19     Nutrition          0  661   14 0.02118003
## 20     Nutrition          1  392    9 0.02295918
## 21     Nutrition          2  614   15 0.02442997
## 22 Nutrition + WSH          0  729   26 0.03566529
## 23 Nutrition + WSH          1  367  156 0.42506812
## 24 Nutrition + WSH          2  652  128 0.19631902
```

```
# access to improved latrine
```

```
impr_lat <- summarise(d.svy, n=sum(!is.na(impr_lat)), count=sum(impr_lat, na.rm=T), mean=mean(impr_lat, na.rm=T))
print(impr_lat, n=24)
```

```
## Source: local data frame [24 x 5]
```

```
## Groups: tr [?]
```

```
##
##          tr studyyear      n count      mean
##          <fctr>      <dbl> <int> <int>      <dbl>
## 1      Control          0 1788  309 0.1728188
## 2      Control          1  993  178 0.1792548
## 3      Control          2 1381  271 0.1962346
## 4 Passive Control          0  878  153 0.1742597
## 5 Passive Control          1    0    0      NaN
## 6 Passive Control          2    0    0      NaN
## 7          Water          0  844  150 0.1777251
## 8          Water          1  461   74 0.1605206
## 9          Water          2  664  128 0.1927711
## 10     Sanitation          0  836  131 0.1566986
## 11     Sanitation          1  458  409 0.8930131
## 12     Sanitation          2  683  534 0.7818448
## 13 Handwashing          0  847  157 0.1853601
## 14 Handwashing          1  486   65 0.1337449
## 15 Handwashing          2  654  119 0.1819572
## 16          WSH          0  867  153 0.1764706
## 17          WSH          1  526  472 0.8973384
```

```
## 18          WSH          2    644    529 0.8214286
## 19    Nutrition          0    794    119 0.1498741
## 20    Nutrition          1    424     63 0.1485849
## 21    Nutrition          2    613     99 0.1615008
## 22 Nutrition + WSH          0    872    143 0.1639908
## 23 Nutrition + WSH          1    477    425 0.8909853
## 24 Nutrition + WSH          2    706    561 0.7946176
```

```
# Child feces safely disposed
```

```
ch_feces_safe_disp <- summarise(d.svy, n=sum(!is.na(ch_feces_safe_disp)), count=sum(ch_feces_safe_disp, na.rm=T), mean=mean(ch_feces_safe_disp, na.rm=T))
print(ch_feces_safe_disp, n=24)
```

```
## Source: local data frame [24 x 5]
```

```
## Groups: tr [?]
```

```
##
##          tr studyyear      n count      mean
##          <fctr>      <dbl> <int> <int>      <dbl>
## 1      Control          0    721    114 0.1581137
## 2      Control          1    903    338 0.3743079
## 3      Control          2   1320    136 0.1030303
## 4 Passive Control          0    323     51 0.1578947
## 5 Passive Control          1     0      0      NaN
## 6 Passive Control          2     0      0      NaN
## 7          Water          0    310     53 0.1709677
## 8          Water          1    424    158 0.3726415
## 9          Water          2    625     52 0.0832000
## 10     Sanitation          0    347     67 0.1930836
## 11     Sanitation          1    412    317 0.7694175
## 12     Sanitation          2    643    240 0.3732504
## 13 Handwashing          0    319     54 0.1692790
## 14 Handwashing          1    431    157 0.3642691
## 15 Handwashing          2    616     62 0.1006494
## 16          WSH          0    369     65 0.1761518
## 17          WSH          1    463    326 0.7041037
## 18          WSH          2    597    205 0.3433836
## 19    Nutrition          0    310     33 0.1064516
## 20    Nutrition          1    391    155 0.3964194
## 21    Nutrition          2    578     52 0.0899654
## 22 Nutrition + WSH          0    353     56 0.1586402
## 23 Nutrition + WSH          1    432    287 0.6643519
## 24 Nutrition + WSH          2    657    219 0.3333333
```

```
# handwashing location has water and soap
```

```
watsoap_avail <- summarise(d.svy, n=sum(!is.na(watsoap_avail)), count=sum(watsoap_avail, na.rm=T), mean=mean(watsoap_avail, na.rm=T))
print(watsoap_avail, n=24)
```

```
## Source: local data frame [24 x 5]
```

```
## Groups: tr [?]
```

```
##
##          tr studyyear      n count      mean
##          <fctr>      <dbl> <int> <int>      <dbl>
## 1      Control          0   1913     96 0.05018296
## 2      Control          1   1043    124 0.11888782
```

```
## 3      Control      2 1458 127 0.08710562
## 4 Passive Control    0  936  58 0.06196581
## 5 Passive Control    1   0   0      NaN
## 6 Passive Control    2   0   0      NaN
## 7      Water        0  902  56 0.06208426
## 8      Water        1  477  53 0.11111111
## 9      Water        2  696  49 0.07040230
## 10     Sanitation    0  890  42 0.04719101
## 11     Sanitation    1  473  49 0.10359408
## 12     Sanitation    2  712  57 0.08005618
## 13 Handwashing      0  914  52 0.05689278
## 14 Handwashing      1  501 381 0.76047904
## 15 Handwashing      2  690 159 0.23043478
## 16      WSH         0  912  64 0.07017544
## 17      WSH         1  536 416 0.77611940
## 18      WSH         2  675 130 0.19259259
## 19     Nutrition     0  843  57 0.06761566
## 20     Nutrition     1  454  61 0.13436123
## 21     Nutrition     2  650  76 0.11692308
## 22 Nutrition + WSH   0  918  53 0.05773420
## 23 Nutrition + WSH   1  493 381 0.77281947
## 24 Nutrition + WSH   2  735 152 0.20680272
```

```
# Mean sachets of LNS fed in prior week to index child 6-24 mos
lnsp <- summarise(d.svy,n=sum(!is.na(lnsp)),mean=mean(lnsp,na.rm=T))
print(lnsp, n=24)
```

```
## Source: local data frame [24 x 4]
## Groups: tr [?]
##
##      tr studyyear      n      mean
##      <fctr>      <dbl> <int>    <dbl>
## 1      Control      0     0      NaN
## 2      Control      1     0      NaN
## 3      Control      2     0      NaN
## 4 Passive Control    0     0      NaN
## 5 Passive Control    1     0      NaN
## 6 Passive Control    2     0      NaN
## 7      Water        0     0      NaN
## 8      Water        1     0      NaN
## 9      Water        2     0      NaN
## 10     Sanitation    0     0      NaN
## 11     Sanitation    1     0      NaN
## 12     Sanitation    2     0      NaN
## 13 Handwashing      0     0      NaN
## 14 Handwashing      1     0      NaN
## 15 Handwashing      2     0      NaN
## 16      WSH         0     0      NaN
## 17      WSH         1     0      NaN
## 18      WSH         2     0      NaN
## 19     Nutrition     0     0      NaN
## 20     Nutrition     1  397 0.9471033
## 21     Nutrition     2  224 1.1406250
## 22 Nutrition + WSH   0     0      NaN
```

```
## 23 Nutrition + WSH      1   417 0.9560637
## 24 Nutrition + WSH      2   247 1.1648352
```

```
#-----
# combine estimates into a single matrix that matches Jade's
#-----
uptake.tabn <- as.data.frame(
  rbind(
    promoter_vis$n,
    freechl$n,
    impr_lat$n,
    ch_feces_safe_disp$n,
    watsoap_avail$n,
    lnspln
  ))
uptake.tabmean <- as.data.frame(
  rbind(
    promoter_vis$mean,
    freechl$mean,
    impr_lat$mean,
    ch_feces_safe_disp$mean,
    watsoap_avail$mean,
    lnspln$mean
  ))
names(uptake.tabn) <- paste(rep(levels(d$str),rep(3,8)),c("0 n","1 n","2 n"))
names(uptake.tabmean) <- paste(rep(levels(d$str),rep(3,8)),c("0 ave","1 ave","2 ave"))

uptake.tab<-cbind(uptake.tabn[,1],uptake.tabmean[,1])
for(i in 2:(ncol(uptake.tabn))){
  uptake.tab<-cbind(uptake.tab,uptake.tabn[,i],uptake.tabmean[,i])
}
uptake.tab<-as.data.frame(uptake.tab)
names(uptake.tab) <- paste(rep(levels(d$str),rep(6,8)),c("0 n","0 ave","1 n","1 ave","2 n","2 ave"))
uptake.tab$label<-c(
  "Promoter visit",
  "Store water with detectable free chlorine",
  "Access to improved latrine",
  "Child feces safely disposed",
  "Primary handwashing station has water and soap",
  "LNS sachet consumption % of expected"
)

# reorder label
uptake_table_A <- uptake.tab[,c(ncol(uptake.tab),1:(ncol(uptake.tab)-1))]

# print table
uptake_table_A
```

```
##                                label Control 0 n Control 0 ave
## 1                        Promoter visit              0      NaN
## 2      Store water with detectable free chlorine      1529    0.02877698
## 3              Access to improved latrine      1788    0.17281879
```

## 4	Child feces safely disposed				721	0.15811373
## 5	Primary handwashing station has water and soap				1913	0.05018296
## 6	LNS sachet consumption % of expected				0	NaN
##	Control 1 n	Control 1 ave	Control 2 n	Control 2 ave	Passive Control 0 n	
## 1	980	0.67959184	1412	0.34844193	0	
## 2	847	0.02951594	1365	0.02783883	736	
## 3	993	0.17925478	1381	0.19623461	878	
## 4	903	0.37430786	1320	0.10303030	323	
## 5	1043	0.11888782	1458	0.08710562	936	
## 6	0	NaN	0	NaN	0	
##	Passive Control 0 ave	Passive Control 1 n	Passive Control 1 ave			
## 1	NaN	0	NaN			
## 2	0.03260870	0	NaN			
## 3	0.17425968	0	NaN			
## 4	0.15789474	0	NaN			
## 5	0.06196581	0	NaN			
## 6	NaN	0	NaN			
##	Passive Control 2 n	Passive Control 2 ave	Water 0 n	Water 0 ave		
## 1	0	NaN	0	NaN		
## 2	0	NaN	720	0.02777778		
## 3	0	NaN	844	0.17772512		
## 4	0	NaN	310	0.17096774		
## 5	0	NaN	902	0.06208426		
## 6	0	NaN	0	NaN		
##	Water 1 n	Water 1 ave	Water 2 n	Water 2 ave	Sanitation 0 n	
## 1	445	0.7595506	680	0.3750000	0	
## 2	385	0.3922078	637	0.2260597	715	
## 3	461	0.1605206	664	0.1927711	836	
## 4	424	0.3726415	625	0.0832000	347	
## 5	477	0.1111111	696	0.0704023	890	
## 6	0	NaN	0	NaN	0	
##	Sanitation 0 ave	Sanitation 1 n	Sanitation 1 ave	Sanitation 2 n		
## 1	NaN	445	0.74831461	692		
## 2	0.02797203	367	0.04904632	641		
## 3	0.15669856	458	0.89301310	683		
## 4	0.19308357	412	0.76941748	643		
## 5	0.04719101	473	0.10359408	712		
## 6	NaN	0	NaN	0		
##	Sanitation 2 ave	Handwashing 0 n	Handwashing 0 ave	Handwashing 1 n		
## 1	0.40173410	0	NaN	480		
## 2	0.02652106	743	0.04037685	417		
## 3	0.78184480	847	0.18536009	486		
## 4	0.37325039	319	0.16927900	431		
## 5	0.08005618	914	0.05689278	501		
## 6	NaN	0	NaN	0		
##	Handwashing 1 ave	Handwashing 2 n	Handwashing 2 ave	WSH 0 n	WSH 0 ave	
## 1	0.69375000	678	0.33628319	0	NaN	
## 2	0.04796163	648	0.02469136	711	0.04078762	
## 3	0.13374486	654	0.18195719	867	0.17647059	
## 4	0.36426914	616	0.10064935	369	0.17615176	
## 5	0.76047904	690	0.23043478	912	0.07017544	
## 6	NaN	0	NaN	0	NaN	
##	WSH 1 n	WSH 1 ave	WSH 2 n	WSH 2 ave	Nutrition 0 n	Nutrition 0 ave
## 1	512	0.7539062	649	0.3713405	0	NaN

## 2	424	0.4245283	598	0.1872910	661	0.02118003
## 3	526	0.8973384	644	0.8214286	794	0.14987406
## 4	463	0.7041037	597	0.3433836	310	0.10645161
## 5	536	0.7761194	675	0.1925926	843	0.06761566
## 6	0	NaN	0	NaN	0	NaN
##	Nutrition 1 n		Nutrition 1 ave		Nutrition 2 n	
## 1	433	0.79445727	635	0.39527559		
## 2	392	0.02295918	614	0.02442997		
## 3	424	0.14858491	613	0.16150082		
## 4	391	0.39641944	578	0.08996540		
## 5	454	0.13436123	650	0.11692308		
## 6	397	0.94710328	224	1.14062500		
##	Nutrition + WSH 0 n		Nutrition + WSH 0 ave		Nutrition + WSH 1 n	
## 1	0	NaN	474			
## 2	729	0.03566529	367			
## 3	872	0.16399083	477			
## 4	353	0.15864023	432			
## 5	918	0.05773420	493			
## 6	0	NaN	417			
##	Nutrition + WSH 1 ave		Nutrition + WSH 2 n		Nutrition + WSH 2 ave	
## 1	0.8185654	710	0.3647887			
## 2	0.4250681	652	0.1963190			
## 3	0.8909853	706	0.7946176			
## 4	0.6643519	657	0.3333333			
## 5	0.7728195	735	0.2068027			
## 6	0.9560637	247	1.1648352			