Cumulative incidences under left truncation
R-code for computations and graphs

Reinhard Meister, Christof Schaefer

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1 Introduction

This paper is a documentation of the code used for preparing the numerical results of the paper *title*. We used the R-function `Sweave` to produce the Latex document which is behind this vignette. Information on R as well as links to downloads can be found at http://www.r-project.org.

2 Preparing data

The study data relevant for the investigations in this paper are saved in the file `study.csv` in comma separated format. It is read into a R-workspace the following way.

```
> study<-read.csv2("study.csv", stringsAsFactors=TRUE, fileEncoding="latin1")
> str(study)
```

```
'data.frame':        1186 obs. of  4 variables:
 $ start: int  6 9 29 32 11 10 16 13 9 16 ...
 $ stop : int  37 40 40 41 39 39 42 39 36 38 ...
 $ group: Factor w/ 2 levels "control","exposed": 1 1 1 1 1 1 1 1 1 1 ...
 $ cause: Factor w/ 3 levels "induced abortion",..: 2 2 2 2 2 2 2 2 2 2 ...
```

The `str` command shows the structure of the study data. Alphanumerical values have automatically been converted to factors. In the following, we change the ordering of the factor levels for convenience.

```
> study$cause<-relevel(study$cause,ref="live birth")
> study$group<-relevel(study$group,ref="exposed")
> str(study)
```

```
'data.frame':        1186 obs. of  4 variables:
 $ start: int  6 9 29 32 11 10 16 13 9 16 ...
 $ stop : int  37 40 40 41 39 39 42 39 36 38 ...
 $ group: Factor w/ 2 levels "exposed","control": 2 2 2 2 2 2 2 2 2 2 ...
 $ cause: Factor w/ 3 levels "live birth","induced abortion",..: 1 1 1 1 1 1 1 1 1 1 ...
```

3 Basic analysis

The R-system consists of basic functions and additional packages. We use the `survival`-package and for producing a more readable table we apply the function `xtable` from the package `xtable`

```
> require(xtable)
```

The observed raw frequencies of events in exposed and controls are found below.

```
> attach(study)
> table(cause,group)
```

```
                     group
cause                 exposed control
  live birth               92     924
  induced abortion         38      20
  spontaneous abortion     43      69
```

```
> detach()
```

Using the function xtable returns tables in nicer format. The main reason for using this function, however, is the safe production of tables without pasting and copying.

```
> xtable(as.matrix(prop.table(table(study$cause,study$group),2)[1:3,1:2]),
+ digits=c(0,2,2))
```

	exposed	control
live birth	0.53	0.91
induced abortion	0.22	0.02
spontaneous abortion	0.25	0.07

4 Cause specific hazard

For displaying cause-specific hazard we define a simple function.

```
> hazard<-function(fit)
+     {
+     time<-fit$time
+     h   <-fit$n.event/fit$n.risk
+     return(data.frame(time=time,h=h))
+     }
```

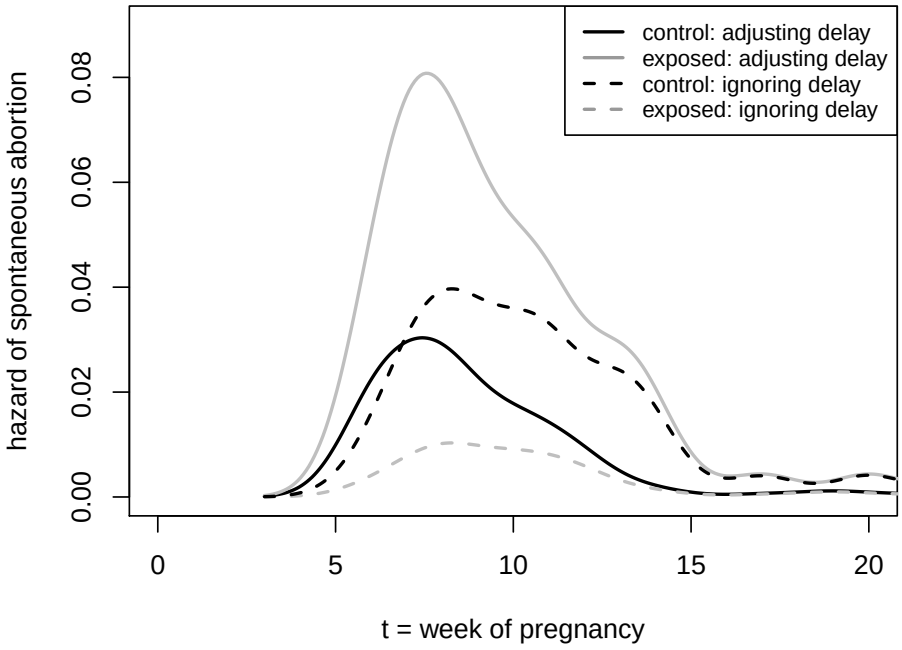
Using the functions from the survival package, we can easily compute the observed hazards under left truncation. Just for demonstration of the effect of left truncation, the hazards pretending start=0 are computed.

```
> require(survival)
> attach(study)
> s.con   <-summary(survfit(Surv(start,stop,cause=="spontaneous abortion")~1
+                           ,data=study[group=="control",]))
> s.exp   <-summary(survfit(Surv(start,stop,cause=="spontaneous abortion")~1
+                           ,data=study[group=="exposed",]))
> s.con.no<-summary(survfit(Surv(stop,cause=="spontaneous abortion")~1
+                           ,data=study[group=="control",]))
> s.exp.no<-summary(survfit(Surv(stop,cause=="spontaneous abortion")~1
+                           ,data=study[group=="exposed",]))
> detach(study)
> h.con<-hazard(s.con)
> h.exp<-hazard(s.exp)
> h.con.no<-hazard(s.con.no)
> h.exp.no<-hazard(s.exp.no)
```

We will use the R-function density, which returns kernel-smoothed density-estimates for a given sample. Defining the estimated hazard as weights, we get the smoothed hazard-functions producing the following plot. By default, density uses and Epanechnikov-kernel, we choose a fixed bandwidth of 1.

```
> plot(h.exp,type="n",xlim=c(0,20),xlab="t = week of pregnancy"
+      ,ylab="hazard of spontaneous abortion",ylim=c(0,.09))
> lines(density(h.con$time,weights=h.con$h,bw=1),lwd=2)
> lines(density(h.exp$time,weights=h.exp$h,bw=1),lwd=2,col=gray(.75))
> lines(density(h.con.no$time,weights=h.con.no$h,bw=1),col=gray(.75)
```

```
+       ,lty=2,lwd=2)
> lines(density(h.exp.no$time,weights=h.exp.no$h,bw=1),lty=2,lwd=2)
> legend("topright",c("control: adjusting delay","exposed: adjusting delay",
+        "control: ignoring delay","exposed: ignoring delay"),
+        col=rep(c(1,gray(.6)),2),lty=rep(1:2,c(2,2)),lwd=2,cex=.8)
```



5 Estimating cumulative incidences

The following code is a one-to-one translations of the paper's formulae. As input start and stop of the oberservation period as well as the cause for termination and the group is assumed. Additionally a subset of the dataset can be specified via the argument sub.

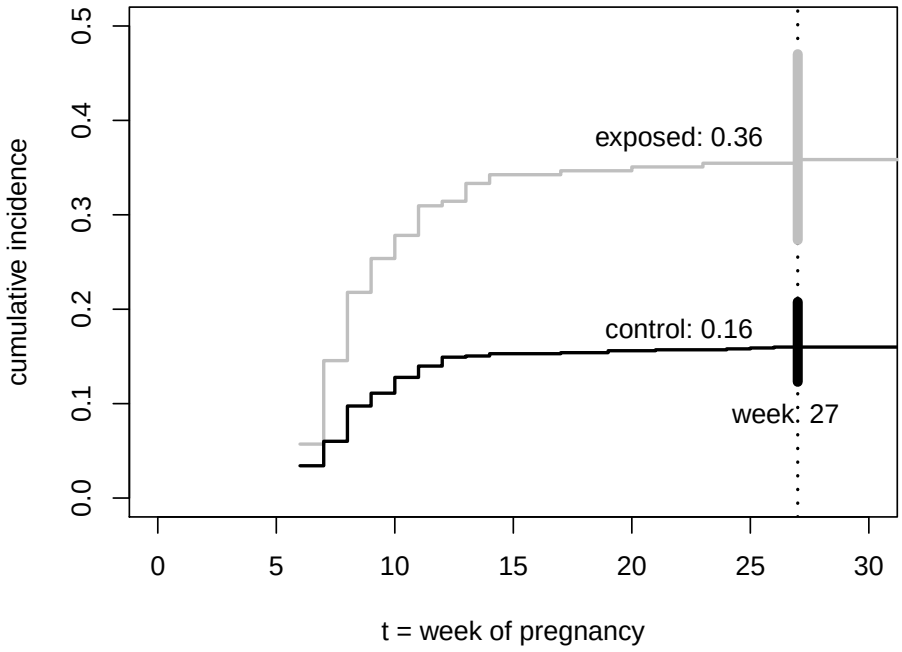
```
> # F.hat.var gives a list of estimates, se's
> # one list element per group and cause
>
> F.hat.var<-function(t.start,t.stop,cause,group,dataset,sub) {
+
+   if(!missing(sub)) dataset <-dataset[sub,]
+   attach(dataset)
+
+   ######## determination of basic quantities using functions from R-package survival
+
+   group.val <- sort(unique(group))
+   f.cum <-list(NULL)
+   for(k in 1:length(group.val))
+   {
+     s.base<-summary(survfit(Surv(t.start,t.stop,cause!=0)~1, data=dataset
+                             , subset=(group==group.val[k])))
+     t.base<- s.base$time
+     d0<- s.base$n.event
+     survival <- s.base$surv
+     n <- s.base$n.risk
+
```

```
+     ######## preparing list of results, one list member for each group and cause
+
+     cause.val<-sort(unique(cause[which(group==group.val[k])]))
+     length(f.cum)<- length(group.val)
+
+     for(i in 1:length(cause.val))
+     {
+       ######## determination of cause specific quantities
+
+       fit<-summary(survfit(Surv(t.start,t.stop,cause==cause.val[i])~1, data=dataset
+                            , subset=(group==group.val[k])))
+       cause.dat <- data.frame(t.base,d0,n)
+       cause.dat$d <- rep(0,length(t.base))
+       cause.dat$d[cause.dat$t.base%in%fit$time] <- fit$n.event
+       d <- cause.dat$d
+       s <- c(1,survival[-length(survival)])
+
+       ########
+
+       f<-cumsum(s*d/n) # cumulative incidence rate
+
+       # calculation of variance estimate for cumulative incidences
+         del.f<-matrix(0,nrow=length(t.base),ncol=length(t.base))
+         del.mat<-outer(f,f,FUN="-")
+         ind<-lower.tri(del.mat)
+         del.f[ind]<-del.mat[ind] # lower triangular containing diffs of f
+         v<-((del.f^2)%*%(d0/(n*(pmax(n-d0,1)))))
+             +cumsum(s^2*d*(n-d)/(n^3))
+             -2*del.f%*%(s*d/(n^2)))
+       ########## see equation ***, computation using matrix multiplication
+
+       # 95% pointwise confidence intervals
+         l.ci <- exp(log(f) -  qnorm(0.975) * sqrt(v)/f)
+         u.ci <- exp(log(f) +  qnorm(0.975) * sqrt(v)/f)
+
+       ########## preparing output, a data frame for each group and cause
+
+       f.cum[[k]][[i]]<-data.frame(
+           t=t.base,                              # event time
+           F=f,                                   # cumulative incidence
+           var.F = v,                             # variance F
+           se.F=sqrt(v),                          # standard error F
+           lower.CI = ifelse(l.ci=="NaN",0,l.ci), # lower 95% pointwise CI
+           upper.CI = ifelse(u.ci=="NaN",1,u.ci), # upper 95% pointwise CI
+           at.risk=n,                             # number at risk
+           d.events=d0,                           # number all events
+           d.cause=d,                             # number events cause specific
+           St.m=s)                                # prob survival before time t
+     }
+     ######## end of for loop for causes
+   }
+   ######## end of for loop for group
+   detach(dataset)
+   return(f.cum)}
```

Applying this function to the study file gives the group and cause specific cumulative incidences, standard errors, 95% pointwise confidence intervals and additional information. The output is also the basis for a graphical display.

```
> cuminc<-F.hat.var(start,stop,cause,group,study)
```

```
> plot(0:30,(0:30)/60,type="n",xlab="t = week of pregnancy",ylab="cumulative incidence")
> lines(cuminc[[1]][[3]][,1:2],col=gray(.75),type="s",lwd=2)
> lines(cuminc[[2]][[3]][,1:2],col=1        ,type="s",lwd=2)
> abline(v=27,lwd=2,lty=3)
> text(22,.38,paste("exposed:",round(cuminc[[1]][[3]][18,2],2)))
> text(22,.18,paste("control:",round(cuminc[[2]][[3]][15,2],2)))
> text(26.5,.09,"week  27")
> lines(cbind(27,c(cuminc[[1]][[3]][18,5:6])),lwd=6,col=gray(.75))
> lines(cbind(27,c(cuminc[[2]][[3]][15,5:6])),lwd=6)
```



6 Validation

Our results were up to rounding errors identical to the values given by Allignol's `etm` package. Concerning the pointwise confidence intervals we used the delta-method and the log-transformation of the cumulative incidences, whereas Allignol implemented the direct formular using the estimated standard deviation of the cumulative incidences.

7 Complete results

The following tables display the estimated subdistribution functions separately for all causes and groups.

	t	F	var.F	se.F	lower.CI	upper.CI	at.risk	d.events	d.cause	St.m
1	6	0.00	0.0000	0.000	0.000	1.000	117	4	0	1.00
2	7	0.00	0.0000	0.000	0.000	1.000	261	9	0	0.97
3	8	0.00	0.0000	0.000	0.000	1.000	374	18	0	0.93
4	9	0.00	0.0000	0.000	0.000	1.000	458	13	0	0.89
5	10	0.00	0.0000	0.000	0.000	1.000	515	14	0	0.86
6	11	0.00	0.0000	0.000	0.000	1.000	561	11	0	0.84
7	12	0.00	0.0000	0.000	0.000	1.000	610	7	0	0.82
8	13	0.00	0.0000	0.000	0.000	1.000	645	2	0	0.81
9	14	0.00	0.0000	0.000	0.000	1.000	673	3	0	0.81
10	17	0.00	0.0000	0.000	0.000	1.000	740	1	0	0.81
11	19	0.00	0.0000	0.000	0.000	1.000	781	2	0	0.81
12	21	0.00	0.0000	0.000	0.000	1.000	799	1	0	0.80
13	24	0.00	0.0000	0.000	0.000	1.000	830	1	0	0.80
14	25	0.00	0.0000	0.000	0.000	1.000	841	1	0	0.80
15	26	0.00	0.0000	0.000	0.000	1.000	846	1	0	0.80
16	30	0.00	0.0000	0.002	0.001	0.010	875	4	4	0.80
17	31	0.01	0.0000	0.002	0.003	0.013	880	3	3	0.80
18	32	0.01	0.0000	0.003	0.004	0.016	880	2	2	0.79
19	33	0.01	0.0000	0.003	0.008	0.022	885	6	6	0.79
20	34	0.02	0.0000	0.005	0.016	0.034	885	11	11	0.79
21	35	0.03	0.0000	0.005	0.022	0.043	880	9	9	0.78
22	36	0.05	0.0000	0.007	0.041	0.068	876	26	25	0.77
23	37	0.08	0.0001	0.008	0.069	0.103	857	36	36	0.75
24	38	0.18	0.0001	0.012	0.157	0.204	823	109	109	0.71
25	39	0.32	0.0002	0.016	0.293	0.354	716	165	165	0.62
26	40	0.56	0.0004	0.020	0.526	0.603	554	280	280	0.48
27	41	0.74	0.0005	0.022	0.701	0.786	274	208	208	0.24
28	42	0.79	0.0005	0.022	0.752	0.839	66	60	60	0.06
29	43	0.80	0.0005	0.022	0.757	0.844	6	6	6	0.01

Table 1: control, cause= live birth

	t	F	var.F	se.F	lower.CI	upper.CI	at.risk	d.events	d.cause	St.m
1	6	0.00	0.0000	0.000	0.000	1.000	35	2	0	1.00
2	7	0.00	0.0000	0.000	0.000	1.000	64	10	0	0.94
3	8	0.00	0.0000	0.000	0.000	1.000	88	19	0	0.80
4	9	0.00	0.0000	0.000	0.000	1.000	87	11	0	0.62
5	10	0.00	0.0000	0.000	0.000	1.000	89	8	0	0.54
6	11	0.00	0.0000	0.000	0.000	1.000	95	8	0	0.50
7	12	0.00	0.0000	0.000	0.000	1.000	94	6	0	0.45
8	13	0.00	0.0000	0.000	0.000	1.000	90	4	0	0.43
9	14	0.00	0.0000	0.000	0.000	1.000	88	2	0	0.41
10	15	0.00	0.0000	0.000	0.000	1.000	91	1	0	0.40
11	17	0.00	0.0000	0.000	0.000	1.000	94	1	0	0.39
12	18	0.00	0.0000	0.000	0.000	1.000	94	1	0	0.39
13	19	0.00	0.0000	0.000	0.000	1.000	94	2	0	0.38
14	20	0.00	0.0000	0.000	0.000	1.000	93	1	0	0.38
15	21	0.00	0.0000	0.000	0.000	1.000	93	1	0	0.37
16	22	0.00	0.0000	0.000	0.000	1.000	93	1	0	0.37
17	23	0.00	0.0000	0.000	0.000	1.000	93	1	0	0.36
18	27	0.00	0.0000	0.004	0.001	0.028	93	2	1	0.36
19	29	0.01	0.0000	0.005	0.002	0.031	91	1	1	0.35
20	31	0.01	0.0000	0.007	0.004	0.036	91	1	1	0.35
21	32	0.02	0.0001	0.008	0.006	0.041	90	1	1	0.34
22	34	0.02	0.0001	0.010	0.010	0.052	89	2	2	0.34
23	35	0.03	0.0001	0.012	0.018	0.067	87	3	3	0.33
24	36	0.05	0.0002	0.015	0.031	0.092	84	5	5	0.32
25	37	0.08	0.0003	0.019	0.055	0.130	79	8	8	0.30
26	38	0.13	0.0006	0.024	0.091	0.186	71	12	12	0.27
27	39	0.18	0.0008	0.028	0.132	0.245	59	13	13	0.23
28	40	0.28	0.0014	0.037	0.220	0.366	46	28	27	0.18
29	41	0.33	0.0016	0.040	0.259	0.419	18	12	12	0.07
30	42	0.35	0.0018	0.042	0.279	0.446	6	6	6	0.02

Table 2: exposed, cause= live birth

	t	F	var.F	se.F	lower.CI	upper.CI	at.risk	d.events	d.cause	St.m
1	6	0.00	0.0000	0.000	0.000	1.000	117	4	0	1.00
2	7	0.01	0.0000	0.005	0.002	0.029	261	9	2	0.97
3	8	0.01	0.0000	0.007	0.006	0.036	374	18	3	0.93
4	9	0.03	0.0001	0.008	0.014	0.048	458	13	6	0.89
5	10	0.03	0.0001	0.009	0.020	0.056	515	14	4	0.86
6	11	0.04	0.0001	0.009	0.023	0.061	561	11	3	0.84
7	12	0.04	0.0001	0.009	0.023	0.061	610	7	0	0.82
8	13	0.04	0.0001	0.009	0.025	0.062	645	2	1	0.81
9	14	0.04	0.0001	0.009	0.026	0.063	673	3	1	0.81
10	17	0.04	0.0001	0.009	0.026	0.063	740	1	0	0.81
11	19	0.04	0.0001	0.009	0.026	0.063	781	2	0	0.81
12	21	0.04	0.0001	0.009	0.026	0.063	799	1	0	0.80
13	24	0.04	0.0001	0.009	0.026	0.063	830	1	0	0.80
14	25	0.04	0.0001	0.009	0.026	0.063	841	1	0	0.80
15	26	0.04	0.0001	0.009	0.026	0.063	846	1	0	0.80
16	30	0.04	0.0001	0.009	0.026	0.063	875	4	0	0.80
17	31	0.04	0.0001	0.009	0.026	0.063	880	3	0	0.80
18	32	0.04	0.0001	0.009	0.026	0.063	880	2	0	0.79
19	33	0.04	0.0001	0.009	0.026	0.063	885	6	0	0.79
20	34	0.04	0.0001	0.009	0.026	0.063	885	11	0	0.79
21	35	0.04	0.0001	0.009	0.026	0.063	880	9	0	0.78
22	36	0.04	0.0001	0.009	0.026	0.063	876	26	0	0.77
23	37	0.04	0.0001	0.009	0.026	0.063	857	36	0	0.75
24	38	0.04	0.0001	0.009	0.026	0.063	823	109	0	0.71
25	39	0.04	0.0001	0.009	0.026	0.063	716	165	0	0.62
26	40	0.04	0.0001	0.009	0.026	0.063	554	280	0	0.48
27	41	0.04	0.0001	0.009	0.026	0.063	274	208	0	0.24
28	42	0.04	0.0001	0.009	0.026	0.063	66	60	0	0.06
29	43	0.04	0.0001	0.009	0.026	0.063	6	6	0	0.01

Table 3: control, cause= induced abortion

	t	F	var.F	se.F	lower.CI	upper.CI	at.risk	d.events	d.cause	St.m
1	6	0.00	0.0000	0.000	0.000	1.000	35	2	0	1.00
2	7	0.06	0.0008	0.029	0.023	0.153	64	10	4	0.94
3	8	0.16	0.0015	0.039	0.098	0.255	88	19	11	0.80
4	9	0.20	0.0017	0.041	0.135	0.299	87	11	6	0.62
5	10	0.23	0.0017	0.042	0.157	0.324	89	8	4	0.54
6	11	0.24	0.0018	0.042	0.167	0.334	95	8	2	0.50
7	12	0.26	0.0018	0.042	0.190	0.358	94	6	5	0.45
8	13	0.26	0.0018	0.042	0.190	0.358	90	4	0	0.43
9	14	0.26	0.0018	0.042	0.190	0.358	88	2	0	0.41
10	15	0.26	0.0018	0.042	0.194	0.362	91	1	1	0.40
11	17	0.26	0.0018	0.042	0.194	0.362	94	1	0	0.39
12	18	0.27	0.0018	0.042	0.198	0.366	94	1	1	0.39
13	19	0.28	0.0018	0.042	0.205	0.374	94	2	2	0.38
14	20	0.28	0.0018	0.042	0.205	0.374	93	1	0	0.38
15	21	0.28	0.0018	0.042	0.209	0.378	93	1	1	0.37
16	22	0.29	0.0018	0.042	0.213	0.382	93	1	1	0.37
17	23	0.29	0.0018	0.042	0.213	0.382	93	1	0	0.36
18	27	0.29	0.0018	0.042	0.213	0.382	93	2	0	0.36
19	29	0.29	0.0018	0.042	0.213	0.382	91	1	0	0.35
20	31	0.29	0.0018	0.042	0.213	0.382	91	1	0	0.35
21	32	0.29	0.0018	0.042	0.213	0.382	90	1	0	0.34
22	34	0.29	0.0018	0.042	0.213	0.382	89	2	0	0.34
23	35	0.29	0.0018	0.042	0.213	0.382	87	3	0	0.33
24	36	0.29	0.0018	0.042	0.213	0.382	84	5	0	0.32
25	37	0.29	0.0018	0.042	0.213	0.382	79	8	0	0.30
26	38	0.29	0.0018	0.042	0.213	0.382	71	12	0	0.27
27	39	0.29	0.0018	0.042	0.213	0.382	59	13	0	0.23
28	40	0.29	0.0018	0.042	0.213	0.382	46	28	0	0.18
29	41	0.29	0.0018	0.042	0.213	0.382	18	12	0	0.07
30	42	0.29	0.0018	0.042	0.213	0.382	6	6	0	0.02

Table 4: exposed, cause= induced abortion

	t	F	var.F	se.F	lower.CI	upper.CI	at.risk	d.events	d.cause	St.m
1	6	0.03	0.0003	0.017	0.013	0.090	117	4	4	1.00
2	7	0.06	0.0004	0.019	0.032	0.112	261	9	7	0.97
3	8	0.10	0.0004	0.021	0.065	0.147	374	18	15	0.93
4	9	0.11	0.0004	0.021	0.077	0.160	458	13	7	0.89
5	10	0.13	0.0004	0.021	0.092	0.177	515	14	10	0.86
6	11	0.14	0.0005	0.021	0.104	0.188	561	11	8	0.84
7	12	0.15	0.0005	0.021	0.113	0.197	610	7	7	0.82
8	13	0.15	0.0005	0.021	0.114	0.199	645	2	1	0.81
9	14	0.15	0.0005	0.021	0.116	0.201	673	3	2	0.81
10	17	0.15	0.0005	0.021	0.117	0.202	740	1	1	0.81
11	19	0.16	0.0005	0.021	0.119	0.204	781	2	2	0.81
12	21	0.16	0.0005	0.021	0.120	0.205	799	1	1	0.80
13	24	0.16	0.0005	0.021	0.121	0.206	830	1	1	0.80
14	25	0.16	0.0005	0.021	0.122	0.207	841	1	1	0.80
15	26	0.16	0.0005	0.021	0.123	0.208	846	1	1	0.80
16	30	0.16	0.0005	0.021	0.123	0.208	875	4	0	0.80
17	31	0.16	0.0005	0.021	0.123	0.208	880	3	0	0.80
18	32	0.16	0.0005	0.021	0.123	0.208	880	2	0	0.79
19	33	0.16	0.0005	0.021	0.123	0.208	885	6	0	0.79
20	34	0.16	0.0005	0.021	0.123	0.208	885	11	0	0.79
21	35	0.16	0.0005	0.021	0.123	0.208	880	9	0	0.78
22	36	0.16	0.0005	0.021	0.124	0.209	876	26	1	0.77
23	37	0.16	0.0005	0.021	0.124	0.209	857	36	0	0.75
24	38	0.16	0.0005	0.021	0.124	0.209	823	109	0	0.71
25	39	0.16	0.0005	0.021	0.124	0.209	716	165	0	0.62
26	40	0.16	0.0005	0.021	0.124	0.209	554	280	0	0.48
27	41	0.16	0.0005	0.021	0.124	0.209	274	208	0	0.24
28	42	0.16	0.0005	0.021	0.124	0.209	66	60	0	0.06
29	43	0.16	0.0005	0.021	0.124	0.209	6	6	0	0.01

Table 5: control, cause= spontaneous abortion

	t	F	var.F	se.F	lower.CI	upper.CI	at.risk	d.events	d.cause	St.m
1	6	0.06	0.0015	0.039	0.015	0.219	35	2	2	1.00
2	7	0.15	0.0024	0.049	0.075	0.283	64	10	6	0.94
3	8	0.22	0.0026	0.051	0.137	0.346	88	19	8	0.80
4	9	0.25	0.0027	0.052	0.170	0.378	87	11	5	0.62
5	10	0.28	0.0026	0.051	0.194	0.400	89	8	4	0.54
6	11	0.31	0.0026	0.051	0.224	0.427	95	8	6	0.50
7	12	0.31	0.0026	0.051	0.229	0.431	94	6	1	0.45
8	13	0.33	0.0025	0.050	0.248	0.448	90	4	4	0.43
9	14	0.34	0.0025	0.050	0.257	0.456	88	2	2	0.41
10	15	0.34	0.0025	0.050	0.257	0.456	91	1	0	0.40
11	17	0.35	0.0025	0.050	0.261	0.460	94	1	1	0.39
12	18	0.35	0.0025	0.050	0.261	0.460	94	1	0	0.39
13	19	0.35	0.0025	0.050	0.261	0.460	94	2	0	0.38
14	20	0.35	0.0025	0.050	0.265	0.463	93	1	1	0.38
15	21	0.35	0.0025	0.050	0.265	0.463	93	1	0	0.37
16	22	0.35	0.0025	0.050	0.265	0.463	93	1	0	0.37
17	23	0.35	0.0025	0.050	0.269	0.467	93	1	1	0.36
18	27	0.36	0.0025	0.050	0.273	0.470	93	2	1	0.36
19	29	0.36	0.0025	0.050	0.273	0.470	91	1	0	0.35
20	31	0.36	0.0025	0.050	0.273	0.470	91	1	0	0.35
21	32	0.36	0.0025	0.050	0.273	0.470	90	1	0	0.34
22	34	0.36	0.0025	0.050	0.273	0.470	89	2	0	0.34
23	35	0.36	0.0025	0.050	0.273	0.470	87	3	0	0.33
24	36	0.36	0.0025	0.050	0.273	0.470	84	5	0	0.32
25	37	0.36	0.0025	0.050	0.273	0.470	79	8	0	0.30
26	38	0.36	0.0025	0.050	0.273	0.470	71	12	0	0.27
27	39	0.36	0.0025	0.050	0.273	0.470	59	13	0	0.23
28	40	0.36	0.0024	0.049	0.277	0.474	46	28	1	0.18
29	41	0.36	0.0024	0.049	0.277	0.474	18	12	0	0.07
30	42	0.36	0.0024	0.049	0.277	0.474	6	6	0	0.02

Table 6: exposed, cause= spontaneous abortion