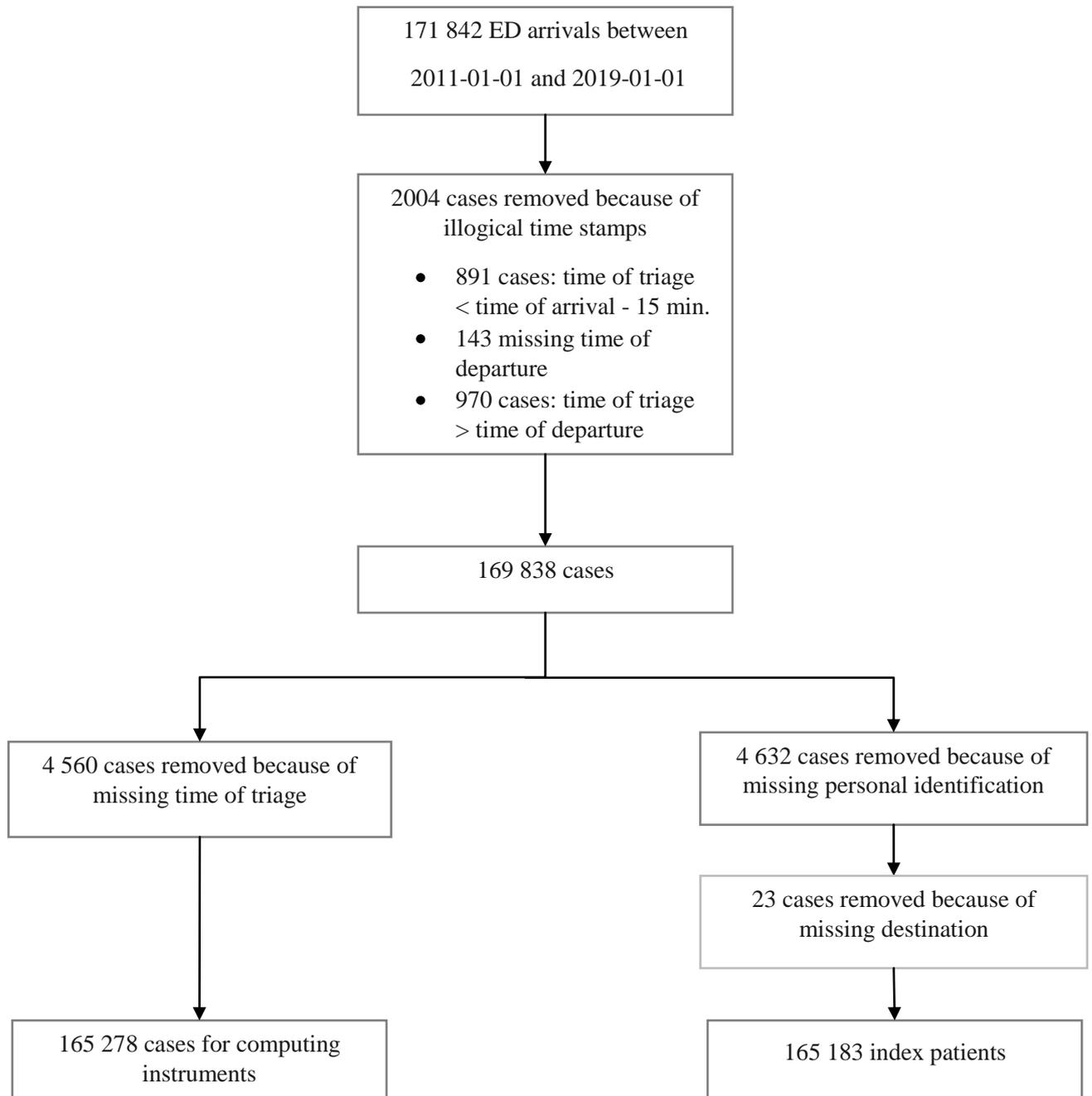


## Supplementary Digital Content

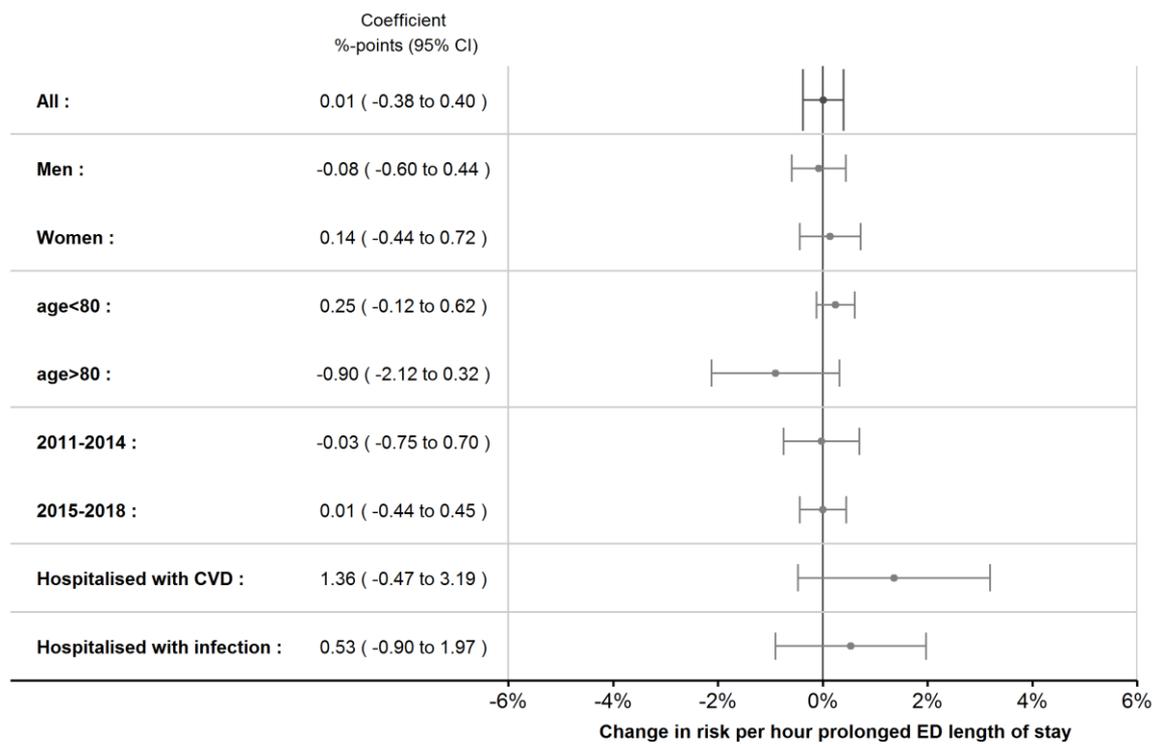
SDC-Figure 1

*Selection of index population, and patient population used for computing strain indicators*



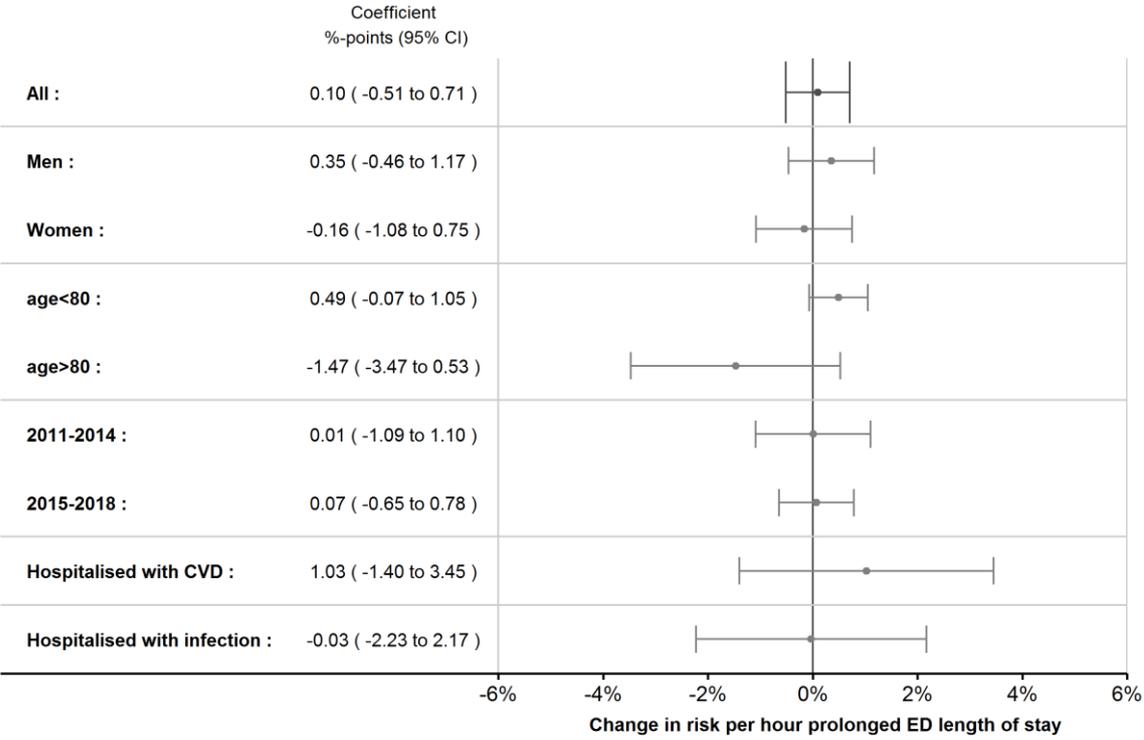
SDC-Figure 2

Change in risk of death within 10-days per hour of ED stay with 95 percent confidence intervals. Adjusted for time variables, medical specialty, readmissions, age with dummy variables for each one-year age interval, and sex



SDC-Figure 3

Change in risk of death within 60-days per hour of ED stay with 95 percent confidence intervals. Adjusted for time variables, medical specialty, readmissions, age with dummy variables for each one-year age interval, and sex



SDC-Table 1

*List of ICD10-codes indicating a bacterial infection*

A00	H66	J20.2	M72.6
A01	H70.0	J20.9	M73
A02	H70.8	J22	M86
A03	H70.9	J39.0	N10
A04	H00	J39.1	N13.6
A05	H01.0	J85-86	N30.0
A30-A49	H01.8	K04.6	N39.0
A54	H01.9	K04.7	N70.0
B95	H10	K12.2	N74
B96	I30.1	L03	N75.1
G00	I33	L08	R57.2
G01	I40	L30.3	T80.2
G04.2	I41.0	M00	T81.4
G05.0	I30.1	M01	T82.6
G06	J02.0	M46.3	T82.7
G07	J02.8	M46.5	T83.5
G08	J03	M60.0	T83.6
H60.0	J13-15	M65.0	T84.5
H60.1	J16	M65.1	T84.6
H60.2	J18	M68.0	T84.7
H60.3	J20.0	M71.0	T85.7
H60.9	J20.1	M71.1	T87.4

SDC-Table 2

*Characteristics of study cohort, numbers and % if not else stated*

Characteristics	Total cohort			
	Dead 30 days after admission (N= 5 615)		Not dead 30 days after admission (N= 159 568)	
	No.	%	No.	%
Sex				
Female	2 676	48	80 283	50
Male	2 939	52	79 285	50
Average age (SD)	79 (14) years		58 (22) years	
Average length of ED stay (SD)	2.5 (1.6) h		2.9 (1.8) h	
Average time to triage (SD)	11 (24) min		16 (25) min	
Treated as outpatient	187	3	25 713	16
Admitted into hospital	5 428	97	133 855	84
Within 48 h: Diagnosed with				
CVD	1 555	28	21 626	14
Infection	1 850	33	22 768	14

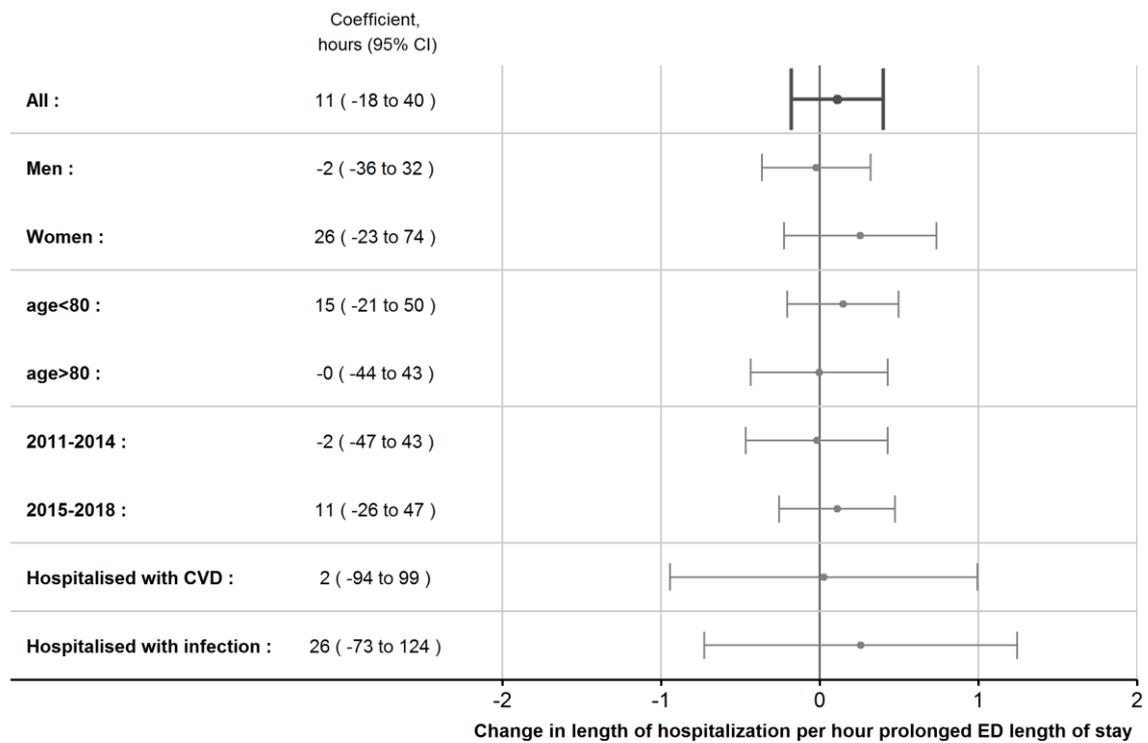
SDC-Table 3

*Association between the candidate instruments and length of ED stay, with F-statistic for the association, adjusted for time variables, medical specialty and readmissions*

		<b>Minutes prolonged length of ED stay (95% CI)</b>	<b>F-value</b>
<b>Group</b>			
Indicator: Average time to triage in minutes	All	0.75 ( 0.71, 0.80)	1154
	Men	0.80 ( 0.74, 0.86)	626
	Women	0.71 ( 0.64, 0.77)	525
	Age<80	0.74 ( 0.69, 0.79)	906
	Age>80	0.84 ( 0.74, 0.94)	262
	2011-2014	0.77 ( 0.70, 0.84)	502
	2014-2018	0.77 ( 0.71, 0.83)	665
	Hospitalised with CVD	0.65 ( 0.54, 0.77)	129
	Hospitalised with infection	0.71 ( 0.60, 0.81)	174
Indicator: Number of red patients	All	5.55 ( 5.10, 6.01)	570
	Men	5.72 ( 5.07, 6.37)	295
	Women	5.40 ( 4.77, 6.03)	279
	Age<80	5.49 ( 4.98, 6.00)	452
	Age>80	5.95 ( 4.91, 6.99)	126
	2011-2014	5.31 ( 4.67, 5.96)	262
	2014-2018	5.76 ( 5.13, 6.40)	315
	Hospitalised with CVD	5.11 ( 3.97, 6.25)	77
	Hospitalised with infection	5.84 ( 4.74, 6.93)	109

SDC-Figure 4

Change in hospitalisation length per hour of length of ED stay with 95 percent confidence intervals. Adjusted for time variables, medical specialty, readmissions, age with dummy variables for each one-year age interval and sex



## SDC-Text 1

R-code for computing the strain-indicators from time of arrival, triage, and triage-level. To speed up the code, we select only Ntest arrivals prior to the index patient to check whether to include in computing the instrument. Ntest should be larger than the largest possible number of arrivals during any three-hour period. Time stamps are measured in terms of seconds from a fixed origin (cf. POSIX-standard):

```
df      <- data.frame(Arrival,Triage,TriageLevel)
df$TimeToTriage <- (df$Triage-df$Arrival)/60 # In minutes
Ntest     <- 100
window_lower <- 0.25*60*60
window_upper <- 3.25*60*60

df$TTT_instrument <- rep(0,nrow(df))
df$Red_instrument <- rep(0,nrow(df))

df      <- df[order(df$In),]
for (j in 1:nrow(df)){ # j is index patient
  ind_test     <- (j-Ntest):(j-1)
  diff         <- df$Arrival[j]-df$Triage[ind_test]
  ind_instrument <- ind_test[(diff>window_lower) &
                             (diff<window_upper)]
  df$TTT_instrument[j] <- mean(df$TimeToTriage[ind_instrument],na.rm=T)
  df$Red_instrument[j] <- sum(df$TriageLevel[ind_instrument]=="Red",na.rm=T)
}
# If there were no patients in the window, the above code returns NA for
# the TTT-instrument. We set these entries to zero:
df$TTT_instrument[which(is.na(df$TTT_instrument))] <- 0
```

R-code for performing the analysis using *ivpack* in R. The data frame *df* now includes variables with dummy for death within 30 days, length of ED stay, sex, age with dummy variables for each one-year age interval, dummy for readmitted patient, medical specialty, weekday/holiday, dummy for combination of month and year. Cluster correction of standard errors is done using patient identifier.

```
library("ivpack")
iv1 <- ivreg(deceased30~EDLOS+Sex+Age_cat+Readm+Spec+Hour+WeekHoliday+MonthYear |
             Sex+Age_cat+Readm+Spec+Hour+WeekHoliday+MonthYear+
             TTT_instrument+Red_instrument, data=df,x=TRUE)
iv1_CC <- cluster.robust.se(iv1, df$PatientID)
```