stir — Report incidence-rate comparison

Description

`stir` reports point estimates and confidence intervals for the incidence-rate ratio (IRR) and incidence-rate difference (IRD). Stratified IRRs may be standardized to produce standardized mortality ratios.

`stir` can be used with single- or multiple-record and single- or multiple-failure st data.

Quick start

IRR and IRD with confidence intervals for exposure indicator `exposed` using `stset` data

```
stir exposed
```

Same as above, but display exact p-values calculated without the mid-p adjustment

```
stir exposed, exact
```

Crude and Mantel–Haenszel combined IRRs with test of homogeneity for strata defined by `svar`

```
stir exposed, strata(svar)
```

Same as above, and standardize the IRRs by weighting variable `wvar`

```
stir exposed, strata(svar) standard(wvar)
```

Same as above, but standardize using time at risk for the unexposed group as weights

```
stir exposed, strata(svar) estandard
```

Menu

Statistics > Survival analysis > Summary statistics, tests, and tables > Report incidence-rate comparison

Syntax

```
stir exposedvar [ if ] [ in ] [ , options ]
```

options	Description
Options	
strata(*varname*)	stratify on *varname*
estandard	combine external weights with within-stratum statistics
istandard	combine internal weights with within-stratum statistics
standard(*varname*)	combine user-specified weights with within-stratum statistics
pool	display pooled estimate
nocrude	do not display crude estimate
nohom	do not display homogeneity test
ird	calculate standardized IRD
midp	display *p*-values calculated using mid-*p* adjustment (unstratified only); the default
exact	display exact *p*-values without mid-*p* adjustment (unstratified only)
level(#)	set confidence level; default is level(95)
noshow	do not show st setting information

You must stset your data before using stir; see [ST] **stset**.

by and collect are allowed; see [U] **11.1.10 Prefix commands**.

fweights and iweights may be specified using stset; see [ST] **stset**. stir may not be used with pweighted data.

Options

Options

strata(*varname*) specifies that the calculation be stratified on *varname*, which may be a numeric or string variable. Within-stratum statistics are shown and then combined with Mantel–Haenszel weights. Also see the by() option in [R] **Epitab**.

estandard, istandard, standard(*varname*), pool, nocrude, nohom, and ird are relevant only if strata() is specified; see [R] **Epitab**.

midp and exact are relevant only if strata() is not specified; see [R] **Epitab**.

level(#) is relevant in all cases; see [R] **Epitab**.

noshow is relevant in all cases; it prevents stir from showing the key st variables. This option is seldom used because most people type stset, show or stset, noshow to set whether they want to see these variables mentioned at the top of the output of every st command; see [ST] **stset**.

Remarks and examples

stir examines the incidence rate and time at risk.

```
. use https://www.stata-press.com/data/r19/page2
. stir group
       Failure _d: dead
  Analysis time _t: time
Incidence-rate comparison
Exposed:   group = 2
Unexposed: group = 1
```

	group		
	Exposed	Unexposed	Total
Failures	19	17	36
Time	5023	4095	9118
Incidence rate	.0037826	.0041514	.0039482
	Point estimate		[95% conf. interval]
Inc. rate diff.	-.0003688		-.002974 .0022364
Inc. rate ratio	.9111616		.4484366 1.866047 (exact)
Prev. frac. ex.	.0888384		-.8660469 .5515634 (exact)
Prev. frac. pop	.04894		

```
Mid-p-values for tests of incidence-rate difference:
  Adj Pr(Exposed failures <= 19) = 0.3900 (lower one-sided)
  Adj Pr(Exposed failures >= 19) = 0.6100 (upper one-sided)
              Two-sided p-value = 0.7799
```

Specifying the `exact` option displays p-values for the tests of IRD calculated without using the mid-p adjustment. The `noshow` option suppresses the display of st variables.

```
. stir group, exact noshow
Incidence-rate comparison
Exposed:   group = 2
Unexposed: group = 1
```

	group		
	Exposed	Unexposed	Total
Failures	19	17	36
Time	5023	4095	9118
Incidence rate	.0037826	.0041514	.0039482
	Point estimate		[95% conf. interval]
Inc. rate diff.	-.0003688		-.002974 .0022364
Inc. rate ratio	.9111616		.4484366 1.866047 (exact)
Prev. frac. ex.	.0888384		-.8660469 .5515634 (exact)
Prev. frac. pop	.04894		

```
Exact p-values for tests of incidence-rate difference:
  Pr(Exposed failures <= 19) = 0.4536 (lower one-sided)
  Pr(Exposed failures >= 19) = 0.6737 (upper one-sided)
           Two-sided p-value = 0.9071
```

See [R] **Epitab** for details about the `exact` option and other `stir` options.

Video example

How to calculate incidence rates and incidence-rate ratios

Stored results

`stir` (without `strata()`) stores the following in `r()`:

Scalars

`r(ird)`	IRD
`r(lb_ird)`	lower CI bound for IRD
`r(ub_ird)`	upper CI bound for IRD
`r(irr)`	IRR
`r(lb_irr)`	lower CI bound for IRR
`r(ub_irr)`	upper CI bound for IRR
`r(afe)`	attributable fraction among the exposed
`r(lb_afe)`	lower CI bound for attributable fraction among the exposed
`r(ub_afe)`	upper CI bound for attributable fraction among the exposed
`r(afp)`	attributable fraction for the population
`r(p_lower_midp)`	lower one-sided p-value with mid-p adjustment
`r(p_upper_midp)`	upper one-sided p-value with mid-p adjustment
`r(p_twosided_midp)`	two-sided p-value with mid-p adjustment
`r(p_lower_exact)`	lower one-sided exact p-value
`r(p_upper_exact)`	upper one-sided exact p-value
`r(p_twosided_exact)`	two-sided exact p-value

`stir, strata()` stores the following in `r()`:

Scalars

`r(irr)`	Mantel–Haenszel IRR, if option `ird` is not specified
`r(lb_irr)`	lower CI bound for Mantel–Haenszel IRR
`r(ub_irr)`	upper CI bound for Mantel–Haenszel IRR
`r(ird)`	Mantel–Haenszel IRD, if option `ird` is specified
`r(lb_ird)`	lower CI bound for Mantel–Haenszel IRD
`r(ub_ird)`	upper CI bound for Mantel–Haenszel IRD
`r(crude)`	crude IRR or, if option `ird` is specified, crude IRD
`r(lb_crude)`	lower CI bound for the crude IRR or IRD
`r(ub_crude)`	upper CI bound for the crude IRR or IRD
`r(pooled)`	pooled IRR or, if option `ird` is specified, pooled IRD
`r(lb_pooled)`	lower CI bound for pooled IRR or IRD
`r(ub_pooled)`	upper CI bound for pooled IRR or IRD
`r(df)`	degrees of freedom for homogeneity χ^2 test
`r(chi2_mh)`	Mantel–Haenszel homogeneity χ^2
`r(chi2_p)`	pooled homogeneity χ^2, if option `pool` is specified

Methods and formulas

`stir` simply accumulates numbers of failures and time at risk by exposed and unexposed (by strata, if necessary) and passes the calculation to `ir`; see [R] **Epitab**.

Reference

Dupont, W. D. 2009. *Statistical Modeling for Biomedical Researchers: A Simple Introduction to the Analysis of Complex Data*. 2nd ed. Cambridge: Cambridge University Press.

Also see

[ST] **stset** — Declare data to be survival-time data

[ST] **stsum** — Summarize survival-time data

[R] **Epitab** — Tables for epidemiologists