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`
- 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)`
- As above, and standardize the IRRs by weighting variable wvar
  - `stir exposed, strata(svar) standard(wvar)`
- 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]
```

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

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

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

`fweight` and `iweight` may be specified using `stset`; see `[ST] stset`. `stir` may not be used with `pweight`ed data.

### 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/r17/page2
. stir group
      Failure _d: dead
      Analysis time _t: time

Incidence-rate comparison
Exposed: group = 2
Unexposed: group = 1

<table>
<thead>
<tr>
<th>group</th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Exposed</td>
<td>Unexposed</td>
<td>Total</td>
</tr>
<tr>
<td>Failures</td>
<td>19</td>
<td>17</td>
<td>36</td>
</tr>
<tr>
<td>Time</td>
<td>5023</td>
<td>4095</td>
<td>9118</td>
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Incidence rate

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<tr>
<th>Point estimate</th>
<th>[95% conf. interval]</th>
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<tr>
<td>Inc. rate diff.</td>
<td>-.0003688</td>
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<tr>
<td>Inc. rate ratio</td>
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</tr>
<tr>
<td>Prev. frac. ex.</td>
<td>.0888384</td>
</tr>
<tr>
<td>Prev. frac. pop</td>
<td>.04894</td>
</tr>
</tbody>
</table>

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
      Failure _d: dead
      Analysis time _t: time

Incidence-rate comparison
Exposed: group = 2
Unexposed: group = 1

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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 χ² test
r(chi2_mh)     Mantel–Haenszel homogeneity χ²
r(chi2_p)      pooled homogeneity χ², 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

Also see

[ST] stset — Declare data to be survival-time data
[ST] stsum — Summarize survival-time data
[R] Epitab — Tables for epidemiologists