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]
```

**Options**

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

You must `stset` your data before using `stir`; see [ST] `stset`. `by` is allowed; see [D] `by`. `fweights` and `iweights` 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/r16/page2
. stir group
    failure _d:  dead
    analysis time _t:  time
```

Incidence-rate comparison

<table>
<thead>
<tr>
<th>group</th>
<th>Exposed</th>
<th>Unexposed</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Failures</td>
<td>19</td>
<td>17</td>
<td>36</td>
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<tr>
<td>Time</td>
<td>5023</td>
<td>4095</td>
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<tr>
<td>Incidence rate</td>
<td>.0037826</td>
<td>.0041514</td>
<td>.0039482</td>
</tr>
<tr>
<td>Inc. rate diff.</td>
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<td>.0022364</td>
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<td>.4484366</td>
<td>1.866047 (exact)</td>
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<tr>
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<td>-.8660469</td>
<td>.5515634 (exact)</td>
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<tr>
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<td></td>
</tr>
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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
```

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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

\texttt{stir} (without \texttt{strata()}) stores the following in \texttt{r()}: 

Scalars
\begin{itemize}
  \item \texttt{r(ird)} \quad IRD
  \item \texttt{r(lb\_ird)} \quad lower CI bound for IRD
  \item \texttt{r(ub\_ird)} \quad upper CI bound for IRD
  \item \texttt{r(irr)} \quad IRR
  \item \texttt{r(lb\_irr)} \quad lower CI bound for IRR
  \item \texttt{r(ub\_irr)} \quad upper CI bound for IRR
  \item \texttt{r(afe)} \quad attributable fraction among the exposed
  \item \texttt{r(lb\_afe)} \quad lower CI bound for attributable fraction among the exposed
  \item \texttt{r(ub\_afe)} \quad upper CI bound for attributable fraction among the exposed
  \item \texttt{r(lb\_crude)} \quad lower CI bound for the crude IRR or IRD
  \item \texttt{r(ub\_crude)} \quad upper CI bound for the crude IRR or IRD
  \item \texttt{r(lb\_pooled)} \quad lower CI bound for pooled IRR or IRD
  \item \texttt{r(ub\_pooled)} \quad upper CI bound for pooled IRR or IRD
  \item \texttt{r(df)} \quad degrees of freedom for homogeneity \( \chi^2 \) test
  \item \texttt{r(chi2\_mh)} \quad Mantel–Haenszel homogeneity \( \chi^2 \)
  \item \texttt{r(chi2\_p)} \quad pooled homogeneity \( \chi^2 \), if option \texttt{pool} is specified
\end{itemize}

\texttt{stir, strata()} stores the following in \texttt{r()}: 

Scalars
\begin{itemize}
  \item \texttt{r(irr)} \quad Mantel–Haenszel IRR, if option \texttt{ird} is not specified
  \item \texttt{r(lb\_irr)} \quad lower CI bound for Mantel–Haenszel IRR
  \item \texttt{r(ub\_irr)} \quad upper CI bound for Mantel–Haenszel IRR
  \item \texttt{r(ird)} \quad Mantel–Haenszel IRD, if option \texttt{ird} is specified
  \item \texttt{r(lb\_ird)} \quad lower CI bound for Mantel–Haenszel IRD
  \item \texttt{r(ub\_ird)} \quad upper CI bound for Mantel–Haenszel IRD
  \item \texttt{r(crude)} \quad crude IRR or, if option \texttt{ird} is specified, crude IRD
  \item \texttt{r(pool)} \quad pooled IRR or, if option \texttt{ird} is specified, pooled IRD
  \item \texttt{r(lb\_pooled)} \quad lower CI bound for pooled IRR or IRD
  \item \texttt{r(ub\_pooled)} \quad upper CI bound for pooled IRR or IRD
  \item \texttt{r(df)} \quad degrees of freedom for homogeneity \( \chi^2 \) test
  \item \texttt{r(chi2\_mh)} \quad Mantel–Haenszel homogeneity \( \chi^2 \)
  \item \texttt{r(chi2\_p)} \quad pooled homogeneity \( \chi^2 \), if option \texttt{pool} is specified
\end{itemize}

Methods and formulas

\texttt{stir} simply accumulates numbers of failures and time at risk by exposed and unexposed (by strata, if necessary) and passes the calculation to \texttt{ir}; see \texttt{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