

Rapid Response Systems: Walk, Don't Run.

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Why should we walk, not run?

- While an idea may have surface validity and appear intuitively obvious,
 - Non-independent processes and incorrect initial decisions can lead to negative information cascades resulting in an incorrect decision being propagated.
 - We risk in our "rush to judgment" expending resources and effort that does not result in real improvement in patient safety and quality of care.
 - We also may forsake other strategies that work as well or better potentially with less costs.

Is this happening with Rapid Response Systems?

- Therapies and interventions need to be independently and critically evaluated before they are made the standard of care.
- Rapid Response Systems are well on their way to being viewed as the standard of care.
- But do we have enough evidence to make this leap?

Evidence Based Practice

- While RRSs seem to make intuitive sense, we must ask;
 - Is there adequate evidence of their effectiveness?
 - What are the costs?
 - Are they the best alternative?

How do we measure their effectiveness?

- Outcomes of Interest
 - Hospital mortality
 - Cardio-respiratory arrest
 - Unanticipated ICU admission
 - Length of Stay (ICU/Hospital)
- Are these all that matters?

Review of the evidence.

- We will restrict ourselves to published studies that have examined the impact of RRSs on these outcomes in comparison to appropriate controls.
- Time from from Jan. 1990-June 2005.

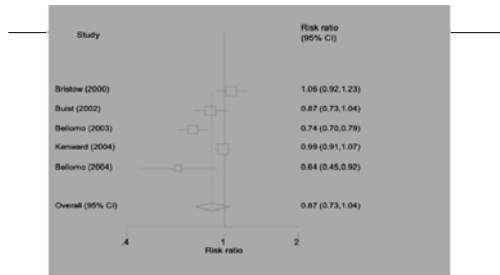
Descriptive Review of the Evidence.

- Effect on Hospital Mortality
 - 3 of 5 non-randomized studies individually found no statistically significant change.
 - 1 randomized study (2792 patients) found a significant improvement and 1 randomized study(125132 patients) found a no statistically significant change.

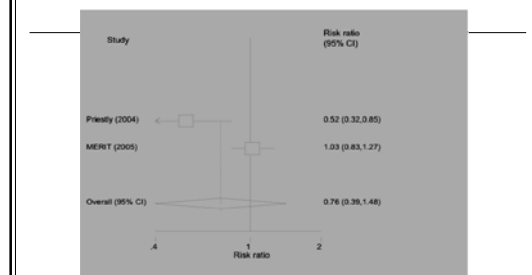
Pooled Analysis of Mortality.

- Non-randomized studies pooled OR=0.87 ((95% CI=0.73-1.04)
- Randomized studies pooled OR=0.76 (95% CI=0.39-1.48)

Effect of RRSs on hospital mortality: non-randomized studies



Effect of RRSs on mortality: randomized studies

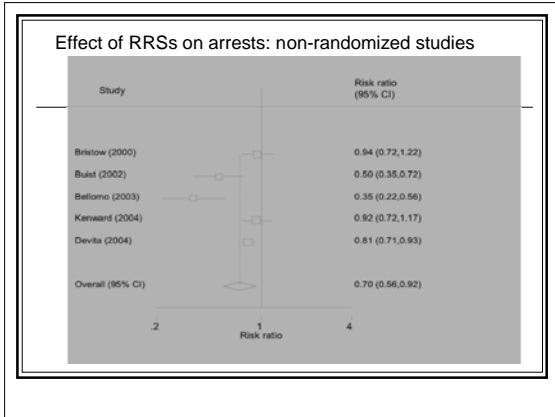


Descriptive Review of the Evidence?

- Effect on incidence of cardio-respiratory arrest
 - 3 of the 5 non-randomized studies reported significant reductions in cardio-respiratory arrest. One showed a non-significant reduction.
 - The other non-randomized study reported a non-significant reduction compared to one cohort control and equivalence when compared to the second.
 - The one randomized study also found a non-significant reduction.

Pooled Analysis of the Incidence of Arrest?

- Non-randomized studies pooled OR=0.70 (95% CI=0.56-0.92) in favor of the RRS intervention.
- Randomized studies: only one study reporting OR=0.94 (95% CI=0.79-1.13) in favor of RRS intervention.

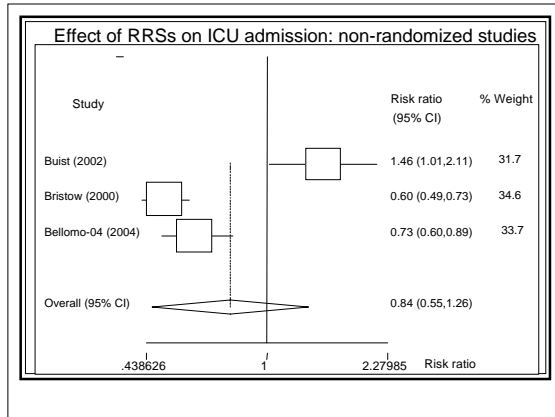


Descriptive Review of the Evidence.

- Effect on Unanticipated ICU Admission
 - 2 of 3 non-randomized studies reported statistically significant reductions.
 - One non-randomized study reported a statistically significant increase.
 - 1 randomized study found a no significant change in unanticipated ICU admission.

Pooled Analysis of Unanticipated ICU Admissions.

- Non-randomized studies pooled OR=0.78 (95% CI=0.46-1.32)
- Randomized studies: Only one study where the OR was 1.04 (95% CI=0.89-1.21)



Descriptive Review of LOS.

- Effect on Length of Stay (LOS)
 - Definitions are extremely heterogeneous so comparisons are difficult. All studies reporting LOS data are non-randomized.
 - 3 studies report reductions in hospital LOS while one reports an increase
 - For ICU LOS, one reported an increase and another reported a decrease.
 - Because of heterogeneity in definitions and denominators, pooled analysis cannot be reliably performed.

Summary of pooled analysis

- All outcomes subject to pooled analysis have point estimates in favor of the Rapid Response System intervention.
- Only for the outcome of cardio-respiratory arrest in the non-randomized studies was this result statistically significant.

Summary of pooled analysis

- Pooled analysis of randomized studies was limited to one outcome (mortality) due to lack of data.
- The one randomized study examining cardio-respiratory arrest found a non-significant benefit.

More Recent Data?

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■ How can we interpret these results?

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- Overall, there is weak to moderate evidence that RRSs are associated with reductions in hospital mortality and cardio-respiratory arrest rates.
- The impact on unanticipated ICU admission is more limited and heterogeneous.

How can we interpret these results?

- The evidence for RRSs reducing the incidence of cardio-respiratory arrest was the strongest result with a statistically significant impact in the non-randomized studies and a non-significant impact in the one randomized study evaluating this outcome.

How can we interpret these results?

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 - Despite some non-significant confidence intervals, all point estimates of the odds ratios are in favor of Rapid Response Systems.
 - General ward patients are being failed by our current systems.
 - Our patients don't have time to wait to if this is the best alternative.
 - The evidence is good enough.

How can we interpret these results?

- Con
 - The data is insufficient to draw conclusions
 - Too few studies, Too few patients
 - Too few studies using randomization in their methodology
 - Not all studies look at all outcomes
 - Heterogeneity
 - The largest randomized one found no significant changes (the "Best" study?)
 - RRSs have costs that require stronger evidence before we adopt them as the standard of care.

What are the Costs?

- There is very limited published data on costs
- Human resources
 - "robbing Peter to pay Paul"
- Financial
 - Covering the FTE's
 - Generating revenue

Additionally,

- Systems and teams are heterogeneous.
- RRTs vs METS, team composition, team strategy, alert scores vs alert criteria, education and training are all issues that have not been well addressed.
- The weak to moderate results in favor of RRSs may be a reflection of this state.

Finally,

- Are we examining the wrong outcomes?
- Are there better measures and tools for evaluating patient safety and quality interventions.
- Are death and cardiac arrest the best measures for systems and patient safety and quality improvement?

Finally,

- Are there process or other measures that are appropriate for evaluation of RRSs?
- How do RRSs compare to other strategies for improving general ward patient safety and quality of care?
 - Hospitalists
 - Improved nursing to patient ratios
 - other strategies?