Risk Adjusted Benchmarking Requirements and Rationale

Category	Requirements	Rationale
Hospitals	The risk adjusted benchmarking program must be based on a dataset that accounts for and reflects geographic diversity on a national basis.	A geographically diverse hospital base is important to account for regional variation in the quality of hospital care – a good performer in a poor performing, isolated region may still be a poor performer compared to a broader population.
	The risk adjusted benchmarking program cannot be limited to a single hospital network or single hospital system, even if geographically diverse.	Limiting to a single hospital network or system does not provide sufficient practice variation to identify patient care issues – e.g. the same or similar approach to care, if approach is ineffective or harmful, would not be detectable.
Patients	At minimum, the risk adjusted benchmarking program must include all patients arriving to the emergency department alive with at least one injury of an AIS severity of three or greater (two or greater for pediatric and Level III trauma centers).	This approach ensures that there is a sufficient breadth of injury types at sufficiently high risk for adverse outcomes that information from the benchmarking program will direct performance improvement activities.
	The risk adjusted benchmarking program must provide documentation of patient inclusion/exclusion criteria.	Program must show that analyses were performed on a reasonably comparable patient sample from hospital to hospital with no major confounding factors (e.g. not accounting for patients with DNR status in mortality adjustment).
	The risk adjusted benchmarking program must be based on a diverse patient population.	Program must be based on patients from a mix of hospital types (e.g., nonprofit, university, community), to help insure a diverse population, so that patients with different levels of access and advantage are included in analyses.
	The risk adjusted benchmarking program must be based on data no older than two admission years prior to the current admission year, at the time each report is provided.	Clinical care is always evolving, and benchmarking should reflect the most current standard of care possible.
Data Quality	With each report, the risk adjusted benchmarking program must make available to participating hospitals information on their data quality including missing data, out of range data, and implausible data. This information must be presented in a manner that allows each hospital to review their data quality compared to other hospitals in the program.	Poor data quality significantly impacts the validity of risk-adjusted modeling. Hospitals must have this information to understand if their results are due to bad patient care or bad data.
	The risk adjusted benchmarking program must have a comprehensive and continuous approach to monitoring and improving data quality, including opportunities to validate and correct data if found to be inaccurate.	If not managed appropriately, missing and otherwise poor-quality data may skew hospital results across the program. For example, hospitals with missing data may falsely appear as high performers.

Risk Adjusted Benchmarking Requirements and Rationale

Category	Requirements	Rationale
Methodology	The risk adjusted benchmarking program must employ validated multivariate modeling, techniques that take multiple predictors into account, and show this by providing information concerning the quality of the model, including model calibration and discrimination.	Effective use of multivariate models accounts for the variability of patient characteristics and the way those characteristics affect outcomes.
	The risk adjusted benchmarking program must incorporate validated analytic techniques to address missing or poor-quality data to minimize the risk of bias. The techniques must be made transparent to users.	Missing and poor-quality data may bias results and reduce the hospital's ability to use results to improve patient care. Analytic techniques to manage missing data increase the validity and usefulness of results.
	The risk adjusted benchmarking program must employ multivariate risk-adjusted models that take into consideration, at minimum, the following variables: • Age • Gender • Pre-existing conditions • Transfer status Mechanism of injury at a level of granularity that extends beyond blunt versus penetrating • Anatomic injury severity across multiple body regions (where applicable) • Measures of physiologic injury severity to include no less than systolic blood pressure and Glasgow Coma Scale	Administrative data (such as procedure codes) alone do not provide adequate information for risk adjustment. These patient demographic and injury characteristics are essential for adequate risk-adjusted benchmarking and account for most of the variation in case mix across centers.
Outcomes	The risk adjusted benchmarking program must provide risk-adjusted comparisons for mortality and hospital events.	These outcomes are fundamental metrics for evaluating trauma center performance, and any satisfactory risk-adjustment program should therefore, at a minimum, provide feedback on these outcomes.
Research	The risk adjusted benchmarking program must make de-identified datasets available to participating hospitals and the research community.	It is important for hospitals to have access to these data, so they can do further analysis to better understand their own results and patient care. Scrutiny of and access to data by researchers and the broader trauma community allows others to provide input into the quality and validity of the data.