Identifying Indicator Top Results and Trends

Methodology Notes

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Overview of methods

1. Identifying top results

Background

There is interest in identifying top results for indicators in Your Health System for regions and facilities. This section describes the methodology that was developed to report these top results.

Methodology

A *facility* (for long-term care indicators) or *health region* is considered to have a top result if

- Its result was in the top decile for the last 3 years; and
- It was statistically significantly different from the **national** average for the last 3 years.

A *hospital* (for acute care indicators) is considered to have a top result if

- Its result was in the top decile of its **peer group** for the last 3 years; and
- It was statistically significantly different from its **peer group** average for the last 3 years.

Note: Small organizations tend to have very low indicator results, creating a situation where a set target (such as the 90th percentile) is rarely achieved. Because of this, only indicator results that are stable can be identified as top results and will be used to determine targets. Some indicators may not have top results because they cannot be assessed or there are no facilities/regions that meet the criteria.

For long-term care indicators, at least 30 annual assessments are required to calculate a top result, and the assessment volume has to have been relatively stable in the last 3 years, with year-to-year increases less than two-fold or year-to-year decreases less than 50%.

Assessment of criteria for identifying top results

This approach

- Is *methodologically sound*, as it accounts for the uncertainty of an indicator result's estimate and ensures that results are comparable;
- Can be *easily understood*, as it relies on concepts (such as confidence intervals and margins of error) that are often used during election campaigns and are regularly reported or discussed in the media; and
- *Enables benchmarking*, as it facilitates the identification of areas of improvement.

The methodology is restrictive in that a small proportion of health regions and facilities are likely to have top results, and they must have shown consistently superior results.

2. Trending indicators

Background

Trend analysis summarizes results over time for facilities, regions, provinces and territories for a given indicator in Your Health System.

2 types of indicators were considered:

- Lead indicators: those that can change relatively quickly as a result of a policy intervention; and
- Lag indicators: those for which the effect of policy interventions takes a relatively longer time to materialize.

For the lead indicators, 3 years of data were used for the trend analysis; for the lag indicators, 5 to 10 years of data were used. In special situations, such as the introduction of a new organization/region or a new indicator, the trend analysis can be performed for lag indicators with a minimum of 3 years of data as long as the most recent year of data is available. When quantile regression was used for trending percentiles or medians, 5 years of record-level data were used. When 5 years of record-level data for quantile regression were not available, 3 or 4 years of data could be used, but a cautionary note would be added (e.g., “Fewer than 5 years of data might have greater uncertainty in indicating a real temporal trend”). Trend analysis is not done when a specific organization does not meet this minimum criterion.

This section describes the methodology used for trend analysis.

Methodology

For many *directional indicators*, regression analysis was used to determine trends. The trends were determined by running regression models over the reporting year/period. The regression model was flexible in 2 ways:

- First, it allowed for the capture of sustained increases/decreases in indicator results over time.
- Second, it took into account the precision of the individual indicator estimates so that more precise estimates contributed more toward fitting the trend than less-precise estimates.

In the linear regression model, results for individual years were modelled to determine the trend. In the logistic regression model, the ratio of the risk-adjusted counts or age-standardized counts and the denominator counts for individual years were used as the outcome. For trending percentiles or medians by quantile regression, record-level data was used.

The statistical significance of the regression coefficients was used to determine whether or not a trend exists. The statistical significance level at 0.05 was used to determine the significance for most tests or models, with the exception of using 0.01 for the quantile regression of record-level data. The direction of the trend was determined by the sign of the regression coefficient estimate.

Your Health System: Descriptions of trends

Depending on the indicator, an increasing trend may be more (e.g., Life Expectancy) or less (e.g., Experiencing Pain in Long-Term Care) desirable. Therefore, the directionality of the indicator must be considered when interpreting the results. For those indicators where higher values are desirable, an increasing trend will represent improvement over time, and vice versa. On the other hand, for those indicators where lower values are desirable, a decreasing trend will represent improvement over time, and vice versa.

In Your Health System, possible trends for *directional indicators* for an organization (facility, health region or province) are labelled as follows:

- Improving
- No change
- Weakening

Trend descriptions used for indicators where we cannot say that higher or lower values are necessarily desirable (Cost of a Standard Hospital Stay and Age-Adjusted Public Spending per Person) are

- Increasing more than average
- Increasing less than average

Appendix

FAQ

1. **What do we mean by a stable facility indicator result for the purposes of identifying top results?**

   For the purpose of identifying top results, a result for a facility is stable if 1 of the following 2 conditions is satisfied:

   - There are no observed outcome events and there are at least 50 denominator cases; or
   - At least one outcome event is observed, but increasing the numerator by 1 event increases the facility's adjusted results by less than 10%, in relative terms.

   Note: If a facility has a result that is statistically significantly different from the peer average, it is considered stable.

2. **What do we mean by being in the top decile (90th percentile)?**

   An indicator result is in the 90th percentile if the **confidence interval** of the indicator result overlaps or exceeds the 90th percentile. This may sound somewhat liberal, but it is essential to use this methodology because results that are identified as being better than others should be "head and shoulders" above the rest, after taking into account the random variability of the results. By using the confidence intervals (or hypothesis tests, if possible), we ensure that we identify all indicator results that are not statistically significantly different from the 90th percentile or better. This approach is fair to all facilities that might have fallen short of the exact 90th percentile value due to chance.

   Using the confidence intervals to determine which facilities fall in the top decile will likely identify more than 10% of facilities as having top results in any particular year. However, results have to have been in the top 10% for the previous 3 years in order to be included. This reduces the number of results reported to fewer than 10% for a number of indicators.

3. **What do we mean by being different from the average?**

   For many clinical indicators, it is possible for indicator results to be in the top decile and yet remain not statistically significantly different from the national average (for long-term care facilities or health regions) or peer group average (for hospitals). In effect, even though the point estimates suggest that the results are top results, they are not precise enough to be distinguishable from the rest. Such results should therefore not be identified as top results.

4. What are directional indicators?

These are indicators for which higher or lower results can be defined as more or less desirable, depending on how the indicator values are changing. For example, All Patients Readmitted to Hospital is a directional indicator because it is clear that a lower value for an organization is preferable.

On the other hand, an indicator such as Cost of a Standard Hospital Stay cannot be said to be directional, because it is not clear whether a reduction or increase is more desirable.

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