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Creating confidence in leading indicators to get leadership buy in

How to align the data, trends and calculate predictions to provide tactical analytics to ensure data accuracy and reliability

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Align data with business goals

1. What are our goals and how do we prioritize them? (what are we solving for?)
   a. Most important factor
      i. Improving poor patient outcomes
      ii. Decreasing unnecessary Healthcare Resource Utilization (HCRU)
      iii. Improve process or outcome measure

2. What data will we need to address our goals?
   a. Prospective cohort, registry, claims database, EHR, etc
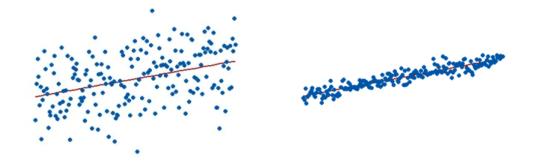   b. You'll need to the appropriate data to have a complete picture

3. How will we source data?
   a. Will we be using our own internally collected data?
   b. If not, which data vendors offer us the best fit-for-purpose data set?
   c. Can we link our data to their data? I.e Claims data

4. Ultimately, how do we have confidence the data, no matter the source, help deliver for the patients, providers, and payors?

Calculate predictions and trends

Visual Representation of R-squared

To visually demonstrate how R-squared values represent the scatter around the regression line, you can plot the fitted values by observed values.

The R-squared for the regression model on the left is 15%, and for the model on the right it is 85%. When a regression model accounts for more of the variance, the data points are closer to the regression line. In practice, you'll never see a regression model with an R^2 of 100%. In that case, the fitted values equal the data values and, consequently, all the observations fall exactly on the regression line.

1. Frost, J. Regression Analysis: An Intuitive Guide for Using and Interpreting Linear Models. 2020.

1. Many ways to calculate predictions
   a. Basic Regression using frequentist methods, Bayesian methods, Machine Learning (classification and regression; supervised and unsupervised)
   b. Understanding what data is being input in the model is critical to assessing the quality of the data that is output.
   c. "All models are wrong, but some are useful." George Box

2. Trends provide us with insights over time and with the right data the ability to look backward for any deviations that may cause those differences
   a. Learn from these deviations and apply them to get more accurate results in the future

Be transparent about limitations

To determine the limitations of your data, be sure to:

• Verify all the variables you'll use in your model.

• Assess the scope of the data, especially over time, so your model can avoid the seasonality trap.

• Check for missing values, identify them, and assess their impact on the overall analysis.

• Watch out for extreme values (outliers) and decide on whether to include them in the analysis.

• Confirm that the pool of training and test data is large enough.

• Make sure *data type* (integers, decimal values, or characters, and so forth) is correct and set the upper and lower bounds of possible values.

• Pay extra attention to data integration when your data comes from multiple sources.

• Choose a relevant dataset that is representative of the whole population.

• Choose the right parameters for your analysis.

Communicate insights effectively

Tailored to the needs of stakeholders

When you design a system or format for data presentation, it's essential to understand the needs of your users. What are the specific objectives that your data will help them to achieve? Clarity about goals provides a direction to your data reporting methods and also helps quantify the business benefits of your reports.

Good design aids understanding and appeals to users

You need to put careful thought into the design of your data reports, graphs, dashboards or visualizations. In order to communicate data effectively, your reports and dashboards should be simple to understand as well as visually appealing

Select the right chart technique

There are many different techniques to communicate data visually, from simple line graphs or bar charts to spider charts, treemaps, and word clouds. The availability of software tools has made it easy for us to plot many new types of charts. However, some of the old ones still work very well, especially because they are extremely familiar to us and we can grasp their meaning at a glance. When you are using charts, it is important to select a chart type that is best suited to the data and helps viewers to interpret it; remember, fancier is not necessarily better.

Make it easy to interact with data

Can your audience explore the data on their own to find meaning and discover insights? Features such as filters, hovers, drill-downs, and selectors can help them see the data from different perspectives or perform "what-if" analysis. Add such interactive features in order to bring out the real power of data for your users.