**Healthcare Information & Decision Equation: Information🡺Decision 🡺Action🡺Outcome**

 **Is it true🡺Is it useful 🡺Is it usable?**

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| **Correlation analysis** is a mechanism to analyze how different variables relate to each other.**Types of Variables: s**tatistical tests are chosen based on type of variables; the 4 main types are—* **Nominal** (named categories without any measurable scale such as ethnic groups)
* **Dichotomous** or binary (two mutually exclusive categories resulting in “either this or that” such as “death” or “survival”)
* **Ordinal** or ranked (three or more variables that can be “ordered” or ranked such as good/better/best or satisfied/neutral/unsatisfied)
* **Continuous** (can be anywhere along a continuum, e.g., blood glucose readings)
* Variables under study are also classed as “**dependent**” (the outcome under study) or “**independent**” (all others that might affect the “dependent” variable)

**Correlation Analysis** includes the following analysis categories— |
| **Analysis Type** | **Purpose** | **Analysis Methods** |
| Univariate Analysis | Methods for analyzing data on a single variable | Frequency distribution |
| Bivariate Analysis | Assess relationship of two variables | Correlation analysisLinear regression |
| Multivariable Analysis | Assess relationship of multiple variables to a single outcome | Multiple regressionProportional hazards |
| Multivariate Analysis | Assess relationship of multiple variables to multiple outcomes | (not reviewed) |
| Sometimes “-variate” and “-variable” get misapplied |
| **Pearson Correlation Coefficient** * Commonly used correlation analysis method
* Extent of the linear relationship (how independent and dependent variables change together) is calculated for the two variables by calculating the **Pearson correlation coefficient,** referred to as the **r value**
* Pearson correlation coefficient (r) is frequently used when both variables are continuous to show **how variables change together**, e.g., salt intake and blood pressure
* The *correlation coefficient* has a range of possible values from -1 to +1
* 0 indicates no relationship between the dependent and independent variables
* Positive correlation coefficients indicate that as the value of the independent variable increases, the value of the dependent variable increases
* Negative correlation coefficients indicate that as the value of the independent variable increases, the value of the dependent variable decreases
* r2 (square of the correlation coefficient) represents the proportion of variation in y (on an x-y plot) explained by x (or vice versa)
	+ Example: “…A moderately strong inverse criterion validity correlation (Pearson correlation coefficient = -0.68) was shown when preoperative patients were administered both the AOFAS and FFI questionnaires, and the resultant scores were compared.”
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| **Critical Appraisal Considerations*** It may be incorrect to draw cause/effect conclusions from correlations
	+ Example: Height/weight are correlated, but height does not cause weight
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