**Hand-out: Digging into the numbers**

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| **Steps** |  | **Instructions** |
| Think critically |  | * Establish careful definitions and clear boundaries * Be sceptical of all statistics * Assess the underlying data: Determine the credibility of the source, looking for any indication of bias, compare to other independently derived data, assess accuracy, discard unreliable, inaccurate or cooked data * Assess the validity of inferences and arguments: Check for logical consistency, check for relevance * Focus analysis on specific decisions * Separate fact from values |
| Dig into the numbers |  | * Be sceptical of all statistics. Compare results to independent sources. * Consistency checks (internal, external, check that totals=sum of subtotals, look for internal contradictions, large differences, obvious trends, and cognitive dissonance), look for number that are too small or too large, take ratios of numbers and make sure they relate in a predictable way. Check also relationships between numbers that should be related in a predictable way, compare the numbers with something else with which you are familiar. * Check definitions and coding categories (same time and location?). Check that you can trace someone else’s calculation in a logical way. Trace calculation from data to results. A database or report is only as good as the methodology used to create it. * Check completeness: How many records have unfilled cells? Are the tendencies of nulls consistent in all records, variable types? * Check precision: Are the numbers rounded or? * Check that the information is current * Be a documentation fanatic. Documentation creates a trail for you and others to follow after the analysis is done. Read and write footnotes * Avoid data that are mislabelled, ambiguous, badly documented, or otherwise of unclear pedigree. Discard unreliable data that are invented, cooked, or incompetently created * Beware of illusory precision * Avoid spurious comparability * Normalize your numbers to make comparison easier |
| Doing your analysis |  | * Break problems into component parts. Identify reasons for discrepancies. * Watch out for assumptions * Document everything * Take responsibility for your work * Question authority. Maintain a healthy scepticism of other people’s analysis, and ask questions until you understand their points. Don’t believe everything you read, even if it’s written by a well-known authority. * Value your time and your reader’s * Check all results with simple models * Root out cognitive dissonance wherever it appears * Frame an argument about the decision, support that argument with data, calculations and analysis |
| Use consistent comparisons |  | * Comparisons are similar to controlled experiments in science and critical for achieving real understanding * Normalize numbers over time or per group or any other relevant strata to make figures comparable and comparisons easier * Point out differences, trends, patterns |
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