MODEL REVIEW CHECKLIST

Process checklist for the review of HE models

The following checklist is intended to serve as a tool to ensure appropriate economic model review, but should not be considered to be a definitive statement of, nor a comprehensive list of tasks to support the model review process. A checklist is useful in so far as it provides a systematic approach to model review and focuses the reviewer on the model's strengths and weaknesses.

Model structure

TASK	Where to find in TreeAge Pro
Confirm accuracy of model structure/ Clinical pathways validation against model specification document or dossier report: • Review model disease/treatment pathways • Validate clinical assumptions • Identify the Model Type: - Cohort - Patient Level Simulation (PLS) - Discrete Event Simulation - Partitioned Survival	Visual Tree Editor Dashboard (Review all 3 tabs)

Model inputs and assumptions

TASK	Where to find in TreeAge Pro
Confirm inputs are consistent with model assumptions: - Clinical trial endpoints (or observed outcomes) to be used are in line with clinical assumptions in the model - Numerical data is in line with report and/or consistent with evidence	Visual Tree Editor Variable Properties View
Ensure model inputs are relevant: - All probabilities are between 0 and 1 - All probabilities following each chance nodes sum to 1 - Efficacy and safety input data - HRQL/HSUV data - HRU/cost data - All relevant outcomes included - All relevant events incorporated in model (e.g., side effects) - Model inputs correspond to model time units. (e.g., monthly, annual, etc.) - Parameter uncertainty for PSA (Distributions sampled by EV) Does the mean value of the EV distribution(s) reflect the base case?	Visual Tree Editor Variable Properties View Tables View Distributions View Tree Properties View

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TASK	Where to find in TreeAge Pro
Examine Patient-Level Simulation inputs and ouTreeAge Pro uts (if appropriate): - Examine trackers included to capture disease or treatment-related events (e.g., hospitalization, stroke event, etc)? - Review patient characteristics (Distributions sampled by trial)	Tracker Properties View Distributions View
Review Model Setup: - Basis for decision (e.g., Cost-effectiveness) - Primary OuTreeAge Pro uts from Analysis - Costs and outcomes discounted appropriately	Dashboard Tree Prefs > Calculation > Calculation Method Tree Prefs > Calculation > Payoffs Tree Prefs > Calculation > Payoffs > Discounting
Markov models: - Markov cycle length is consistent and supports research question - Time horizon sufficient to reflect differences in cost and effectiveness (and other outcomes)	Markov Info View (all tabs) [Select each appropriate Markov node]

Running the model

TASK	Where to find in TreeAge Pro
Cost-Effectiveness Analysis (Base Case): - Run CEA; do ICER results match report? - Are outcomes consistent for each strategy?	Analysis > Rankings
Markov Cohort calculations: - Run Markov Cohort Report for each Markov process. - Check that cohort membership over time accurately represents disease progression. - Check outcomes (cost, utility, etc.) calculations cycle by cycle. - Convert any TreeAge Pro Markov model to an Excel model and can use the strategy detail sheets to review calculations - Manually calculate 2-3 cycles of disease progression and check against cohort report.	Markov Cohort Extended Report [Select Markov node before running] Markov To Excel Export function (Markov models only) [Select Root Node if all strategies are Markov. Otherwise, select individual Markov nodes.]
Patient-Level Simulation (Monte Carlo) - Run simulation; generate and review CEA for ICER, as described above. - Turn on patient tracking to review Markov cohort details as described above. - Turn on seeding to generate repeatable results.	Analysis > Monte Carlo Simulation > Trials From simulation output: - CEA > Rankings. - Patient Tracking cohort report. Tree Preferences > Monte Carlo Options > Patient Tracking Selection (Check the box for Patient Tracking) Tree Preferences > Monte Carlo Options > Random Number Seeding Options
Partitioned Survival Analysis - Review survival curves. - Review progression, costs and effectiveness over time.	Analysis > PartSA > Survival Curves Analysis > PartSA > Time Report

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Uncertainty (Sensitivity Analysis)

TASK	Where to find in TreeAge Pro
Analyze deterministic uncertainty results: - Do the base case and sensitivity/scenario analysis results make logical and intuitive sense? - Are they consistent with the input data? - Are they within reasonable ranges of the input data? - Are all important variables explored? - Are the ranges in values evidence-based and reasonable? - Can I reproduce deterministic results from the report? - Run several one-way sensitivity analysis (OWSA) calculations - Run tornado diagram	Analysis > Sensitivity Analysis > 1-way Analysis > Sensitivity Analysis > Tornado Scenario Export to Excel tool
Analyze probabilistic uncertainty results: - Does each distribution reflect an appropriate range of uncertainty for the parameter? - Run the PSA - Are the results consistent with the report? - Turn on seeding to generate repeatable results	Distributions View Analysis > MC Sim > Sampling (Cohort Model) Analysis > MC Sim > Sampling & Trials (Patient-Level Simulation) Tree Preferences > Monte Carlo Options > Random Number Seeding Options

Model Validity and Extreme Value Testing

TASK	Where to find in TreeAge Pro
Model Input Tests: - Change each parameter one at a time and confirm target outputs change as expected.	Variable Properties View Run model
Run the model using Extreme Values for each strategy: - Set drug cost inputs to zero. Drug costs should be zero in the results. - Set other resource use costs to zero. Total costs should reflect only drug costs. - Set efficacy to zero. Survival should be 0. - Set QALY weights to 1.0. QALYs and LY outcomes should be the same. - Set AE risk to zero. No AE costs or QALY impact should occur. - Set discount rates to 0. All outcomes impacted by discounting should match baseline, non-discounted outcomes values. - Set discount rates to 10%. All benefits and costs should decrease	Variable Properties Rankings Report (Re-run analysis) Markov Cohort Extended Report (Re-run analysis) -OR- Markov to Excel Export function (Markov models only)