

Supplemental Figure 6: Assessment of feature impact on MULTI-CLASS predictions for patients with AGE < 60 in the hold-out set. Assessment of feature impact on non-progression (Class 0, **panel A**), pain-only progression (Class 1, **panel B**), radiographic progression (Class 2, **panel C**) and both pain and radiographic progression (Class 3, **panel D**), using “Kernel-SHAP” for multi-class predictions with model AP5_mu. **Left** – impact distribution of the most important features. The colour represents the feature value (red = high, blue = low). A positive SHAP value represents a positive impact on class prediction. **Right** – average impact magnitude of the most important features on class prediction.

