Supplementary Material for

A Conditional Modeling Approach for Dynamic Risk Prediction of A Survival Outcome Using Longitudinal Biomarkers with An Application to Ovarian Cancer

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1 Descriptive statistics of the PLCO ovarian cancer data

Table S1 lists the descriptive statistics of ovarian cancer data from the Prostate, Lung, Colorectal, and Ovarian (PLCO) cancer screening trial. Distributions of baseline age and number of observations for cases and controls are listed.

2 Model fittings from the PLCO ovarian cancer data

This section lists the fitted results of case and control modes for the conditional modeling, joint modeling, and landmarking approaches.

Table S1: Descriptive statistics of 30310 subjects (208 cases and 30102 controls) from the ovarian cancer data in the PLCO Cancer Screening Trial.

Characteristic	Group	Participants in the ovarian cancer data ($N = 30310$)	
		Cases ($M = 208$)	Controls ($N - M = 30102$)
Baseline Age	55-59	58 (27.9%)	10464 (34.8%)
	60-64	60 (28.8%)	9249 (30.7%)
	65-69	52 (25.0%)	6495 (21.6%)
	70+	38 (18.3%)	3894 (12.9%)
Number of Observations	1	32 (15.4%)	1797 (6.0%)
	2	28 (13.5%)	1542 (5.1%)
	3	18 (8.7%)	1764 (5.9%)
	4	37 (17.8%)	3397 (11.3%)
	5	33 (15.9%)	5021 (16.7%)
	6	60 (28.8%)	16581 (55.1%)

2.1 Modeling Fitting for CM

Fitted results of case models with exponential, Gaussian, and latent changepoint kernels under the conditional modeling approach are listed in Table S2.

Table S2: Case models with exponential, Gaussian, and latent changepoint kernels under the conditional modeling approach: point estimates and associated standard errors (in parentheses) were reported.

Parameters	Kernel		
	Exponential	Gaussian	Latent changepoint
intercept: β_0	2.315 (0.404)	2.319 (0.403)	2.321 (0.403)
baseline age: β_1	0.001 (0.006)	0.001 (0.006)	0.001 (0.006)
screening time: β_2	0.007 (0.006)	0.009 (0.006)	0.012 (0.006)
kernel slope: η_1	2.837 (0.244)	6.793 (8.636)	1.751 (0.152)
kernel location: η_2	1.970 (0.126)	-1.405 (1.347)	1.259 (0.028)
kernel scale: η_3	-	2.038 (1.381)	-
SE of random intercept: $\sigma_{b_{i0}}$	0.480 (0.058)	0.479 (0.058)	0.478 (0.058)
SE of random kernel slope: $\sigma_{b_{i0}}$	2.079 (0.091)	5.033 (1.262)	1.372 (0.084)
random effects correlation: $\rho_{b_{i0}b_{i1}}$	-0.280 (0.239)	-0.281 (0.237)	-0.288 (0.237)
SE of random error: σ_ξ	0.237 (0.031)	0.236 (0.031)	0.236 (0.031)
-loglikelihood	376.602	375.106	380.273

Two control models were used: (1) a linear mixed effects model with random intercept and random slope $y_{ij} = \beta_0 + \beta_1 Age_i + \beta_2 t_{ij} + b_{i0} + b_{i1} t_{ij} + \xi_{ij}$; and (2) a linear mixed effects model with natural spline basis of screening time as both random and fixed effects $y_{ij} = \beta_0 + \beta_1 Age_i + \sum_{\ell=1}^{3} (\eta_\ell + b_{i\ell}) B_\ell(t_{ij}, \tau) + b_{i0} + \xi_{ij}$, where the values of τ were set as the 25%th and 75%th quantiles of t_{ij}. Results are in Table S3.

Under CM, the piecewise constant hazard $h_i(t) = h_0(t) \exp(\alpha Age_i)$ that was set to have a knot value of 2, has estimated association as 0.038(0.013) with standard error shown in the parentheses and baseline hazards as $-9.631(0.821)$ and $-9.855(0.810)$.

Table S3: Control models under the conditional modeling approach: point estimates and associated standard errors (in parentheses) are reported.

Parameters	Control models	
	Model (1)	Model (2)
intercept: β_0	2.027 (0.0312)	2.026 (0.0313)
baseline age: β_1	0.005 (0.0005)	0.005 (0.0005)
screening time: β_2	0.008 (0.0004)	-
knot slope 1: η_1	-	0.029 (0.0004)
knot slope 2: η_2	-	0.057 (0.006)
knot slope 3: η_3	-	0.044 (0.008)
SE of random intercept: $\sigma_{b_{i0}}$	0.458	0.463
SE of random knot slope 1: $\sigma_{b_{i1}}$	0.038	0.344
SE of random knot slope 2: $\sigma_{b_{i2}}$	-	0.416
SE of random knot slope 3: $\sigma_{b_{i3}}$	-	0.514
random effects correlation: $\rho_{b_{i0}b_{i1}}$	-0.157	-0.059
random effects correlation: $\rho_{b_{i0}b_{i2}}$	-	-0.162
random effects correlation: $\rho_{b_{i0}b_{i3}}$	-	-0.040
random effects correlation 12: $\rho_{b_{i1}b_{i2}}$	-	-0.324
random effects correlation 13: $\rho_{b_{i1}b_{i3}}$		-0.507
random effects correlation 23: $\rho_{b_{i2}b_{i3}}$		0.730
SE of random error: σ_ξ	0.196	0.182
-loglikelihood	23075.86	22859.96

2.2 Model Fitting for JM

The JM approach has a longitudinal submodel $y_{ij} = m_i(t) + \xi_{ij} = \beta_0 + \beta_1 \mathrm{Age}_i + \beta_2 t_{ij} + b_{i0} + b_{i1} t_{ij} + \xi_{ij}$, where $m_i(t)$ is the true but unobserved biomarker value. Two survival submodels are used: (1) $h_i(t) = h_0(t)\exp(\alpha \text{Age}_i + \gamma m_i(t))$; and (2) $h_i(t) = h_0(t)\exp(\alpha \text{Age}_i + \gamma_1 m_i(t) + \gamma_2 m_i^{'}(t))$, where $h_0(t)$ is a piecewise constant baseline hazard function with 4 internal knots, and $m_i^{'}(t)$ is the first derivative or current slope of $m_i(t)$. Results are in Table S4.

Table S4: Fitted results under the conditional modeling approach: point estimates and associated standard errors (SE) are reported.

Parameters	Joint models	
	Model (1)	Model (2)
intercept: β_0	2.0146 (0.0316)	2.0144 (0.0316)
baseline age: β_1	0.0053 (0.0005)	0.0053 (0.0005)
screening time: β_2	0.0081 (0.0004)	0.0082 (0.0004)
SE of random intercept: $\sigma_{b_{i0}}$	0.463	0.463
SE of random slope: $\sigma_{b_{i1}}$	0.037	0.037
random effects correlation: $\rho_{b_{i0}b_{i1}}$	-0.143	-0.143
age association: α	0.0230 (0.013)	0.0199 (0.013)
current value association: γ_1	1.651 (0.105)	1.358 (0.123)
current slope association: γ_2	-	13.050 (2.122)
baseline hazard 1: $\log(xi.1)$	-13.163 (0.838)	-12.493 (0.849)
baseline hazard 2: $\log(xi.2)$	-13.553 (0.896)	-12.902 (0.904)
baseline hazard 3: $\log(xi.3)$	-13.232 (0.893)	-12.589 (0.903)
baseline hazard 4: $\log(xi.4)$	-12.989 (0.979)	-12.387 (0.994)
baseline hazard 5: $\log(xi.5)$	-11.245 (1.281)	-10.594 (1.280)
SE of random error: σ_ξ	0.201	0.201
-loglikelihood	55496.86	55463.89

2.3 Model Fitting for LM

We fit a Cox proportional hazard function for LM $h_i(t) = h_0(t)\exp(\alpha_1 \text{Age}_i + \alpha_2 t_{is})$, where t_{is} is the biomarker screening time that is most close to the landmarking time s. Given the prediction horizon, a training dataset with administrative censoring is obtained, then the LM is fit based on the training data.

Table S5: Simulation results for Scenarios A1, A2, and A3, where CM_Dep_Exp, CM_Dep_Gau, and CM_Dep_Lat are the true models, respectively. The averaged time-dependent AUC and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
A1	CM_Dep_Exp	0.879 (0.041)	0.769 (0.038)	0.704 (0.033)	0.889 (0.041)	0.785 (0.040)	0.725 (0.033)
	CM_Dep_Gau	0.879 (0.041)	0.769 (0.038)	0.703 (0.033)	0.889 (0.041)	0.784 (0.039)	0.724 (0.033)
	CM_Dep_Lat	0.877 (0.041)	0.764 (0.039)	0.701 (0.033)	0.888 (0.041)	0.777 (0.040)	0.721 (0.033)
	CM_Ind_Exp	0.876 (0.043)	0.763 (0.038)	0.694 (0.035)	0.882 (0.042)	0.768 (0.040)	0.696 (0.035)
	CM_Ind_Gau	0.877 (0.043)	0.763 (0.038)	0.694 (0.034)	0.883 (0.042)	0.768 (0.040)	0.697 (0.035)
	CM_Ind_Lat	0.876 (0.043)	0.759 (0.039)	0.690 (0.034)	0.883 (0.042)	0.758 (0.041)	0.687 (0.035)
	JM	0.812 (0.047)	0.710 (0.041)	0.650 (0.036)	0.806 (0.053)	0.698 (0.041)	0.643 (0.031)
	LM	0.818 (0.048)	0.711 (0.039)	0.651 (0.035)	0.817 (0.052)	0.706 (0.040)	0.648 (0.032)
A2	CM_Dep_Exp	0.882 (0.040)	0.761 (0.038)	0.697 (0.034)	0.893 (0.040)	0.775 (0.040)	0.719 (0.033)
	CM_Dep_Gau	0.883 (0.039)	0.761 (0.038)	0.697 (0.034)	0.893 (0.040)	0.776 (0.039)	0.719 (0.033)
	CM_Dep_Lat	0.882 (0.039)	0.758 (0.040)	0.696 (0.034)	0.893 (0.040)	0.771 (0.040)	0.718 (0.032)
	CM_Ind_Exp	0.881 (0.042)	0.754 (0.039)	0.685 (0.035)	0.887 (0.041)	0.756 (0.040)	0.686 (0.034)
	CM_Ind_Gau	0.881 (0.042)	0.754 (0.039)	0.686 (0.035)	0.888 (0.041)	0.756 (0.040)	0.687 (0.034)
	CM_Ind_Lat	0.881 (0.042)	0.753 (0.040)	0.686 (0.035)	0.888 (0.041)	0.750 (0.041)	0.682 (0.034)
	JM	0.813 (0.047)	0.698 (0.040)	0.640 (0.034)	0.807 (0.053)	0.690 (0.040)	0.638 (0.032)
	LM	0.822 (0.048)	0.703 (0.039)	0.643 (0.034)	0.820 (0.052)	0.700 (0.040)	0.643 (0.032)
A3	CM_Dep_Exp	0.897 (0.037)	0.740 (0.041)	0.685 (0.035)	0.903 (0.039)	0.751 (0.041)	0.702 (0.034)
	CM_Dep_Gau	0.898 (0.037)	0.743 (0.041)	0.687 (0.035)	0.903 (0.039)	0.752 (0.041)	0.703 (0.035)
	CM_Dep_Lat	0.898 (0.037)	0.746 (0.042)	0.688 (0.035)	0.904 (0.039)	0.753 (0.041)	0.704 (0.034)
	CM_Ind_Exp	0.895 (0.039)	0.728 (0.041)	0.671 (0.036)	0.898 (0.040)	0.725 (0.043)	0.668 (0.035)
	CM_Ind_Gau	0.896 (0.038)	0.734 (0.040)	0.677 (0.035)	0.899 (0.040)	0.730 (0.043)	0.672 (0.035)
	CM_Ind_Lat	0.896 (0.038)	0.740 (0.041)	0.680 (0.035)	0.900 (0.040)	0.732 (0.042)	0.673 (0.034)
	JM	0.816 (0.048)	0.682 (0.041)	0.627 (0.036)	0.813 (0.051)	0.675 (0.043)	0.627 (0.034)
	LM	0.833 (0.050)	0.690 (0.041)	0.633 (0.037)	0.831 (0.052)	0.684 (0.045)	0.633 (0.035)

3 Simulation Results for All Scenarios

3.1 Simulation One

3.1.1 Simulation Results for Scenarios A1, A2, and A3

Simulation results of the time-dependent AUCs and Brier scores for Scenario A1, A2, and A3, where CM_Dep_Exp, CM_Dep_Gau, and CM_Dep_Lat were the respective true models are presented in Table S5 and Table S6.

3.1.2 Simulation Results for Scenarios B1, B2, and B3

Simulation results of the time-dependent AUCs and Brier scores for Scenario B1, B2, and B3, where CM_Ind_Exp, CM_Ind_Gau, and CM_Ind_Lat were the respective true models

Table S6: Simulation results for Scenarios A1, A2, and A3, where CM_Dep_Exp, CM_Dep_Gau, and CM_Dep_Lat are the true models, respectively. The averaged Brier scores and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
A1	CM_Dep_Exp	0.015 (0.004)	0.043 (0.006)	0.071 (0.007)	0.014 (0.004)	0.042 (0.007)	0.069 (0.007)
	CM_Dep_Gau	0.015 (0.004)	0.043 (0.006)	0.071 (0.007)	0.014 (0.004)	0.042 (0.007)	0.069 (0.007)
	CM_Dep_Lat	0.016 (0.004)	0.044 (0.006)	0.071 (0.007)	0.014 (0.004)	0.042 (0.007)	0.069 (0.007)
	CM_Ind_Exp	0.016 (0.004)	0.044 (0.006)	0.072 (0.007)	0.014 (0.004)	0.043 (0.007)	0.070 (0.008)
	CM_Ind_Gau	0.016 (0.004)	0.044 (0.006)	0.072 (0.007)	0.014 (0.004)	0.043 (0.007)	0.070 (0.008)
	CM_Ind_Lat	0.016 (0.004)	0.045 (0.006)	0.072 (0.007)	0.014 (0.004)	0.044 (0.007)	0.071 (0.008)
	JM	0.029 (0.005)	0.056 (0.007)	0.082 (0.007)	0.027 (0.006)	0.056 (0.007)	0.081 (0.008)
	LM	0.023 (0.005)	0.053 (0.007)	0.081 (0.007)	0.023 (0.005)	0.053 (0.007)	0.080 (0.008)
A2	CM_Dep_Exp	0.015 (0.004)	0.043 (0.006)	0.071 (0.007)	0.014 (0.004)	0.042 (0.006)	0.069 (0.007)
	CM_Dep_Gau	0.015 (0.004)	0.043 (0.006)	0.071 (0.007)	0.014 (0.004)	0.042 (0.006)	0.069 (0.007)
	CM_Dep_Lat	0.015 (0.004)	0.043 (0.006)	0.071 (0.007)	0.014 (0.004)	0.042 (0.006)	0.069 (0.007)
	CM_Ind_Exp	0.015 (0.004)	0.044 (0.006)	0.072 (0.007)	0.014 (0.004)	0.043 (0.007)	0.070 (0.008)
	CM_Ind_Gau	0.015 (0.004)	0.044 (0.006)	0.072 (0.007)	0.014 (0.004)	0.043 (0.007)	0.070 (0.008)
	CM_Ind_Lat	0.015 (0.004)	0.044 (0.006)	0.072 (0.007)	0.014 (0.004)	0.043 (0.007)	0.071 (0.008)
	JM	0.028 (0.005)	0.056 (0.007)	0.083 (0.007)	0.027 (0.006)	0.056 (0.007)	0.082 (0.008)
	LM	0.023 (0.005)	0.053 (0.006)	0.081 (0.007)	0.023 (0.005)	0.053 (0.007)	0.081 (0.008)
A3	CM_Dep_Exp	0.012 (0.003)	0.042 (0.006)	0.070 (0.007)	0.011 (0.003)	0.041 (0.006)	0.068 (0.007)
	CM_Dep_Gau	0.012 (0.003)	0.042 (0.006)	0.070 (0.007)	0.011 (0.003)	0.041 (0.006)	0.068 (0.007)
	CM_Dep_Lat	0.012 (0.003)	0.042 (0.006)	0.070 (0.007)	0.011 (0.003)	0.041 (0.006)	0.068 (0.007)
	CM_Ind_Exp	0.013 (0.003)	0.042 (0.006)	0.070 (0.007)	0.012 (0.003)	0.042 (0.006)	0.069 (0.008)
	CM_Ind_Gau	0.012 (0.003)	0.042 (0.006)	0.070 (0.007)	0.011 (0.003)	0.042 (0.006)	0.069 (0.008)
	CM_Ind_Lat	0.012 (0.003)	0.042 (0.006)	0.070 (0.007)	0.011 (0.003)	0.042 (0.006)	0.069 (0.008)
	JM	0.029 (0.005)	0.056 (0.007)	0.083 (0.007)	0.027 (0.005)	0.056 (0.007)	0.082 (0.008)
	LM	0.022 (0.005)	0.052 (0.007)	0.080 (0.007)	0.021 (0.005)	0.052 (0.007)	0.079 (0.008)

are presented in Table S7 and Table S8.

Table S7: Simulation results for Scenarios B1, B2, and B3, where CM_Ind_Exp, CM_Ind_Gau, and CM_Ind_Lat are the true models, respectively. The averaged time-dependent AUC and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
B1	CM_Dep_Exp	0.869 (0.041)	0.756 (0.039)	0.686 (0.034)	0.876 (0.041)	0.762 (0.040)	0.686 (0.034)
	CM_Dep_Gau	0.869 (0.041)	0.756 (0.039)	0.686 (0.034)	0.876 (0.040)	0.762 (0.039)	0.686 (0.033)
	CM_Dep_Lat	0.868 (0.041)	0.751 (0.041)	0.681 (0.035)	0.875 (0.041)	0.753 (0.041)	0.678 (0.034)
	CM_Ind_Exp	0.870 (0.040)	0.758 (0.038)	0.688 (0.032)	0.877 (0.041)	0.765 (0.039)	0.692 (0.034)
	CM_Ind_Gau	0.869 (0.041)	0.757 (0.038)	0.688 (0.033)	0.877 (0.040)	0.764 (0.039)	0.691 (0.035)
	CM_Ind_Lat	0.869 (0.041)	0.750 (0.039)	0.681 (0.034)	0.876 (0.041)	0.753 (0.041)	0.681 (0.034)
	JM	0.798 (0.044)	0.697 (0.036)	0.643 (0.031)	0.798 (0.048)	0.693 (0.040)	0.638 (0.036)
	LM	0.814 (0.044)	0.708 (0.036)	0.651 (0.031)	0.808 (0.047)	0.700 (0.039)	0.643 (0.035)
B2	CM_Dep_Exp	0.872 (0.040)	0.746 (0.040)	0.676 (0.034)	0.878 (0.040)	0.746 (0.042)	0.672 (0.035)
	CM_Dep_Gau	0.873 (0.041)	0.746 (0.040)	0.676 (0.034)	0.878 (0.040)	0.746 (0.042)	0.672 (0.035)
	CM_Dep_Lat	0.872 (0.040)	0.742 (0.042)	0.673 (0.036)	0.878 (0.040)	0.740 (0.043)	0.667 (0.034)
	CM_Ind_Exp	0.873 (0.040)	0.747 (0.040)	0.678 (0.033)	0.879 (0.040)	0.748 (0.041)	0.678 (0.035)
	CM_Ind_Gau	0.873 (0.040)	0.747 (0.039)	0.678 (0.033)	0.879 (0.040)	0.748 (0.042)	0.678 (0.036)
	CM_Ind_Lat	0.873 (0.040)	0.743 (0.040)	0.675 (0.034)	0.879 (0.040)	0.743 (0.042)	0.674 (0.035)
	JM	0.793 (0.045)	0.685 (0.039)	0.633 (0.031)	0.790 (0.055)	0.676 (0.042)	0.624 (0.037)
	LM	0.815 (0.043)	0.700 (0.037)	0.643 (0.031)	0.808 (0.048)	0.689 (0.039)	0.633 (0.035)
B3	CM_Dep_Exp	0.888 (0.041)	0.725 (0.044)	0.665 (0.035)	0.894 (0.039)	0.721 (0.042)	0.659 (0.033)
	CM_Dep_Gau	0.888 (0.041)	0.727 (0.044)	0.666 (0.035)	0.894 (0.039)	0.722 (0.041)	0.659 (0.033)
	CM_Dep_Lat	0.888 (0.041)	0.726 (0.045)	0.664 (0.036)	0.894 (0.039)	0.720 (0.041)	0.656 (0.033)
	CM_Ind_Exp	0.888 (0.041)	0.724 (0.044)	0.666 (0.035)	0.894 (0.039)	0.720 (0.043)	0.661 (0.035)
	CM_Ind_Gau	0.889 (0.041)	0.728 (0.043)	0.668 (0.036)	0.895 (0.039)	0.724 (0.042)	0.663 (0.035)
	CM_Ind_Lat	0.889 (0.040)	0.728 (0.043)	0.668 (0.036)	0.895 (0.039)	0.725 (0.042)	0.664 (0.035)
	JM	0.796 (0.050)	0.669 (0.040)	0.622 (0.032)	0.796 (0.060)	0.660 (0.045)	0.612 (0.038)
	LM	0.827 (0.046)	0.685 (0.041)	0.633 (0.033)	0.826 (0.050)	0.677 (0.041)	0.624 (0.036)

3.2 Simulation Two

Simulation results for Scenarios A1, A2, A3, B1, B2, B3, and C are presented in Figures S1, S2, S3, S4, S5, S6, and S7, respectively.

Table S8: Simulation results for Scenarios B1, B2, and B3, where CM_Ind_Exp, CM_Ind_Gau, and CM_Ind_Lat are the true models, respectively. The averaged Brier scores and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
B1	CM_Dep_Exp	0.017 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.071 (0.008)
	CM_Dep_Gau	0.017 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.071 (0.008)
	CM_Dep_Lat	0.017 (0.004)	0.046 (0.007)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.071 (0.008)
	CM_Ind_Exp	0.017 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.071 (0.008)
	CM_Ind_Gau	0.017 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.071 (0.008)
	CM_Ind_Lat	0.017 (0.004)	0.046 (0.007)	0.074 (0.008)	0.015 (0.004)	0.045 (0.007)	0.072 (0.008)
	JM	0.030 (0.005)	0.057 (0.007)	0.084 (0.008)	0.028 (0.006)	0.056 (0.007)	0.082 (0.008)
	LM	0.024 (0.005)	0.054 (0.007)	0.082 (0.008)	0.023 (0.005)	0.054 (0.007)	0.081 (0.008)
B2	CM_Dep_Exp	0.016 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.072 (0.008)
	CM_Dep_Gau	0.016 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.072 (0.008)
	CM_Dep_Lat	0.016 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.045 (0.007)	0.072 (0.008)
	CM_Ind_Exp	0.016 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.072 (0.008)
	CM_Ind_Gau	0.016 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.044 (0.007)	0.072 (0.008)
	CM_Ind_Lat	0.016 (0.004)	0.046 (0.006)	0.074 (0.008)	0.015 (0.004)	0.045 (0.007)	0.072 (0.008)
	JM	0.030 (0.005)	0.058 (0.007)	0.085 (0.008)	0.028 (0.006)	0.057 (0.007)	0.083 (0.008)
	LM	0.024 (0.005)	0.054 (0.006)	0.082 (0.008)	0.023 (0.005)	0.054 (0.007)	0.082 (0.008)
B3	CM_Dep_Exp	0.014 (0.004)	0.044 (0.006)	0.073 (0.007)	0.013 (0.004)	0.043 (0.006)	0.071 (0.007)
	CM_Dep_Gau	0.014 (0.004)	0.044 (0.006)	0.073 (0.007)	0.013 (0.004)	0.043 (0.006)	0.071 (0.007)
	CM_Dep_Lat	0.014 (0.004)	0.044 (0.006)	0.073 (0.007)	0.012 (0.004)	0.043 (0.006)	0.071 (0.007)
	CM_Ind_Exp	0.014 (0.004)	0.042 (0.006)	0.073 (0.007)	0.013 (0.004)	0.043 (0.006)	0.071 (0.007)
	CM_Ind_Gau	0.014 (0.004)	0.044 (0.006)	0.073 (0.007)	0.013 (0.004)	0.043 (0.006)	0.071 (0.007)
	CM_Ind_Lat	0.014 (0.004)	0.044 (0.006)	0.072 (0.007)	0.012 (0.004)	0.043 (0.006)	0.070 (0.007)
	JM	0.030 (0.005)	0.059 (0.007)	0.085 (0.008)	0.029 (0.006)	0.057 (0.007)	0.084 (0.008)
	LM	0.023 (0.004)	0.053 (0.007)	0.082 (0.007)	0.022 (0.005)	0.053 (0.006)	0.081 (0.008)

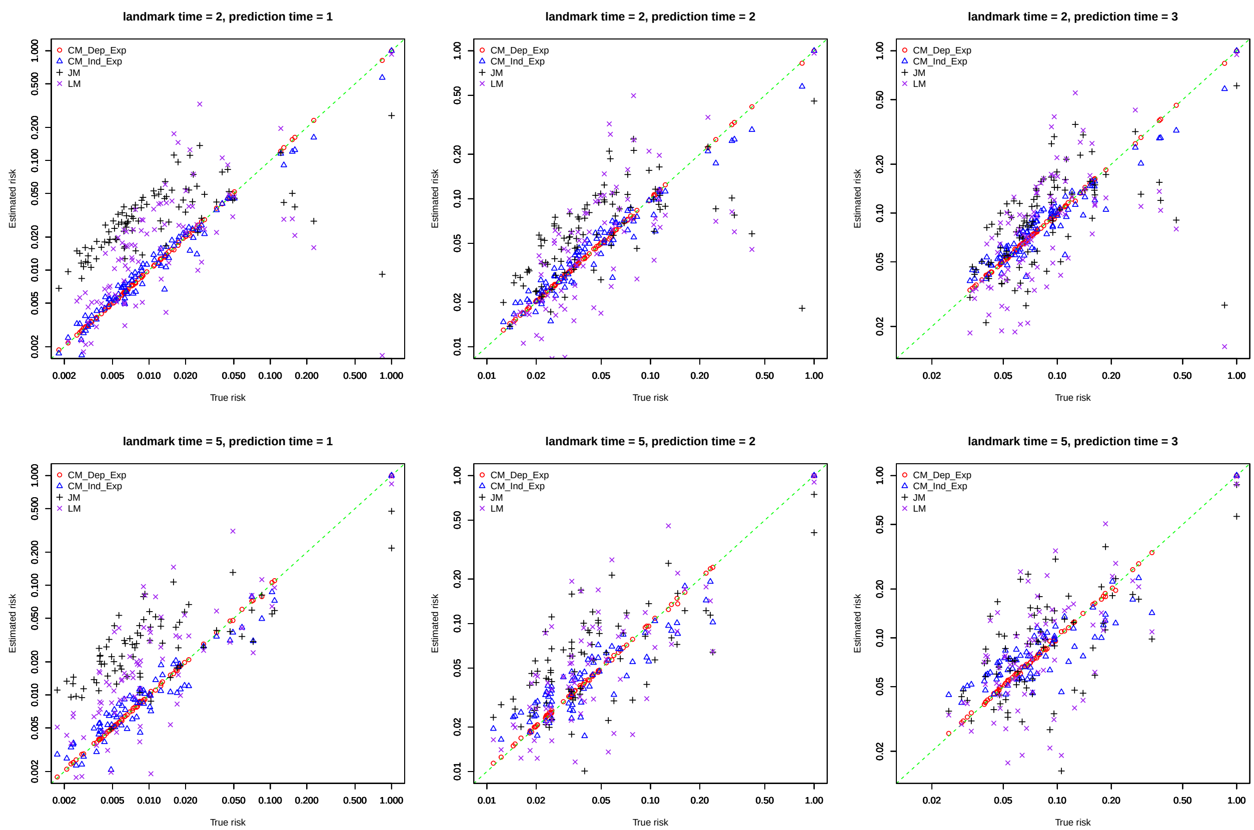

Figure S1: Predicted risks versus true risks in Scenario A1: CM with exponential kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

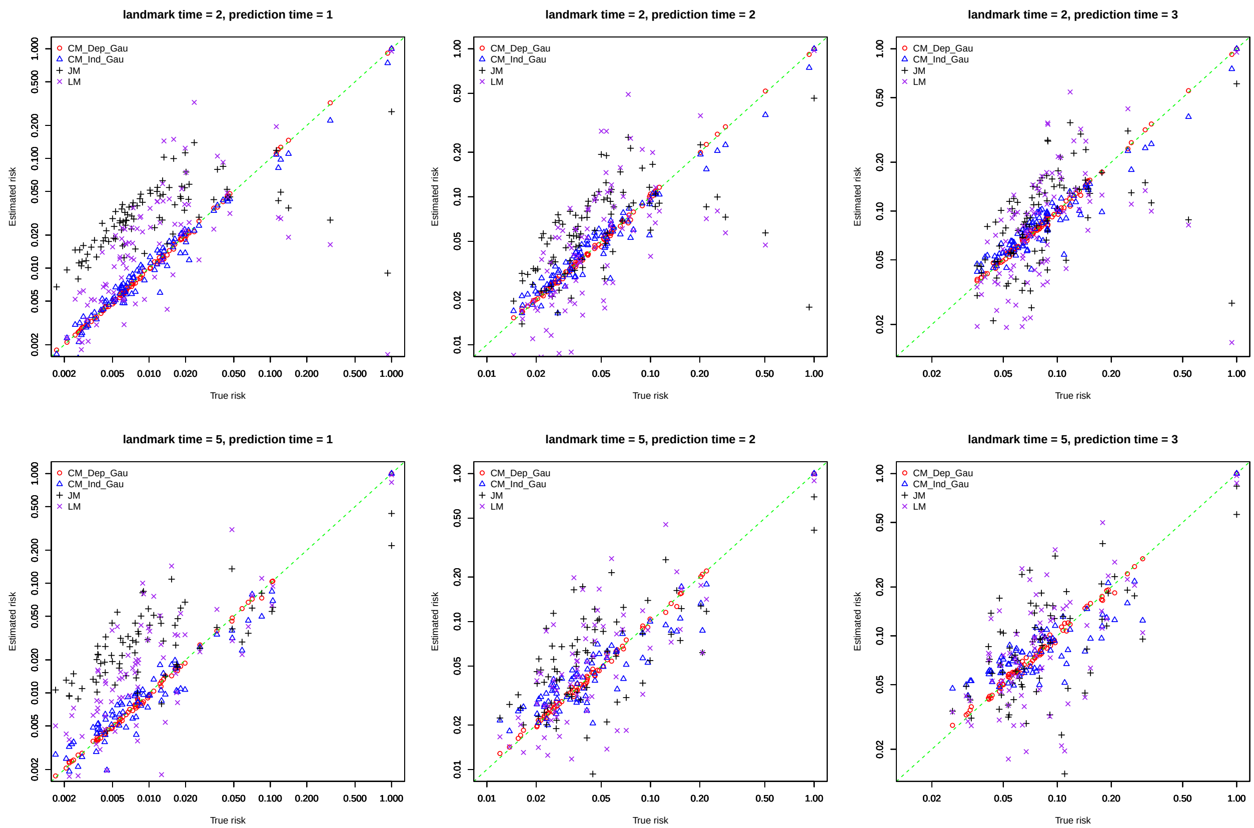

Figure S2: Predicted risks versus true risks in Scenario A2: CM with Gaussian kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

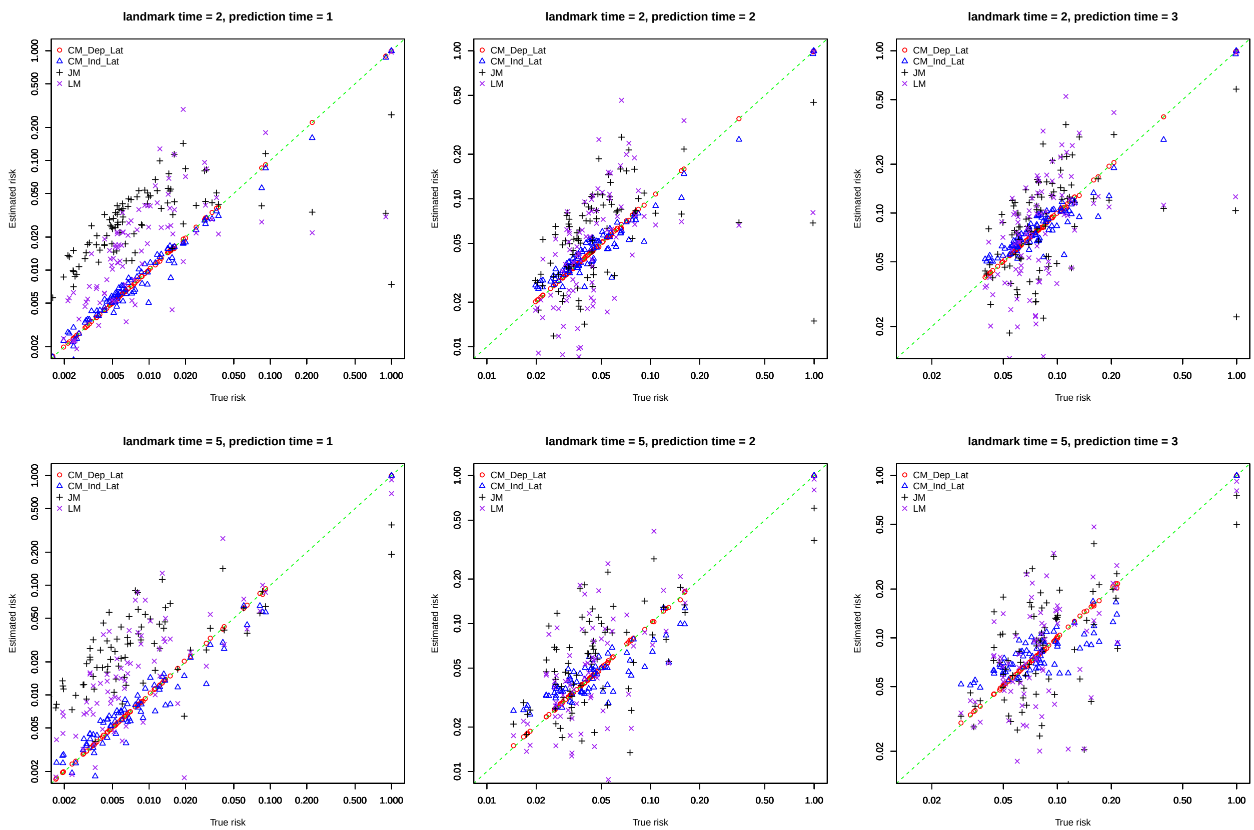

Figure S3: Predicted risks versus true risks in Scenario A3: CM with latent changepoint kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

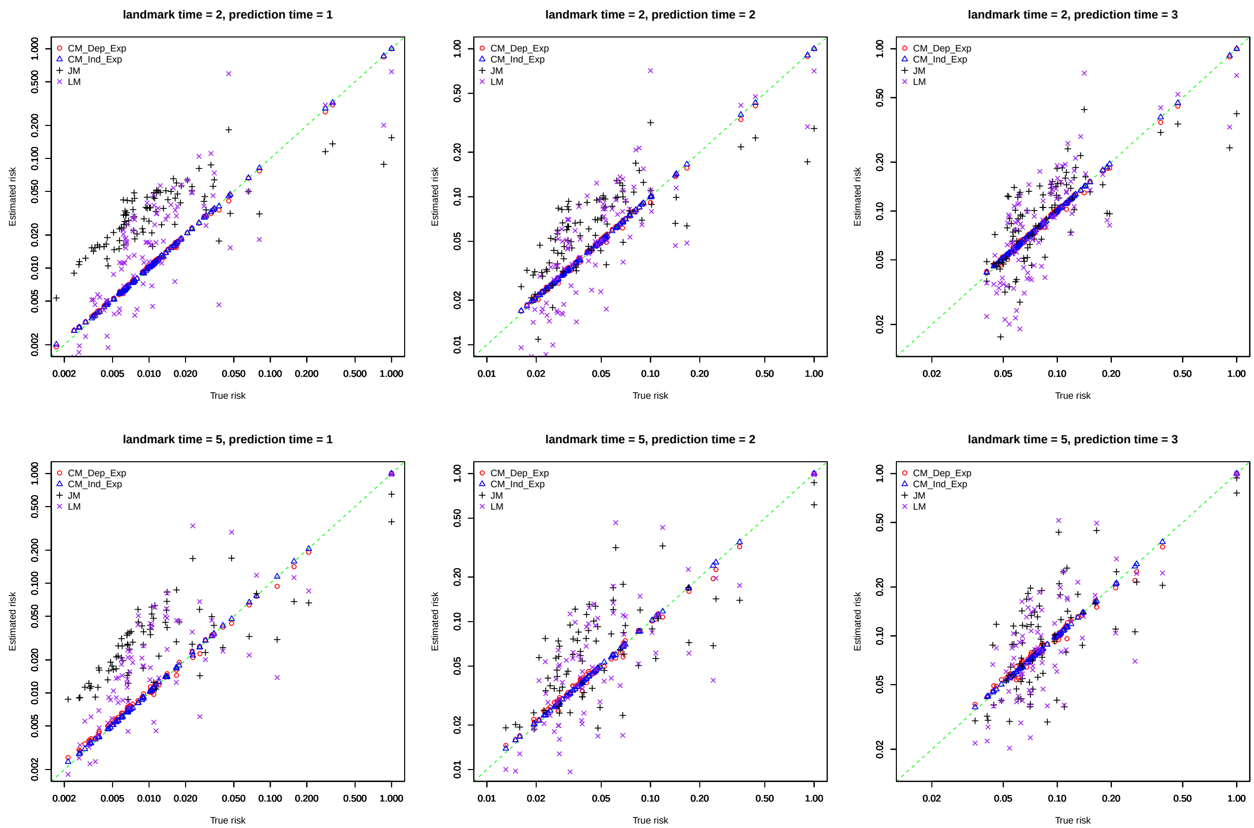

Figure S4: Predicted risks versus true risks in Scenario B1: CM with exponential kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

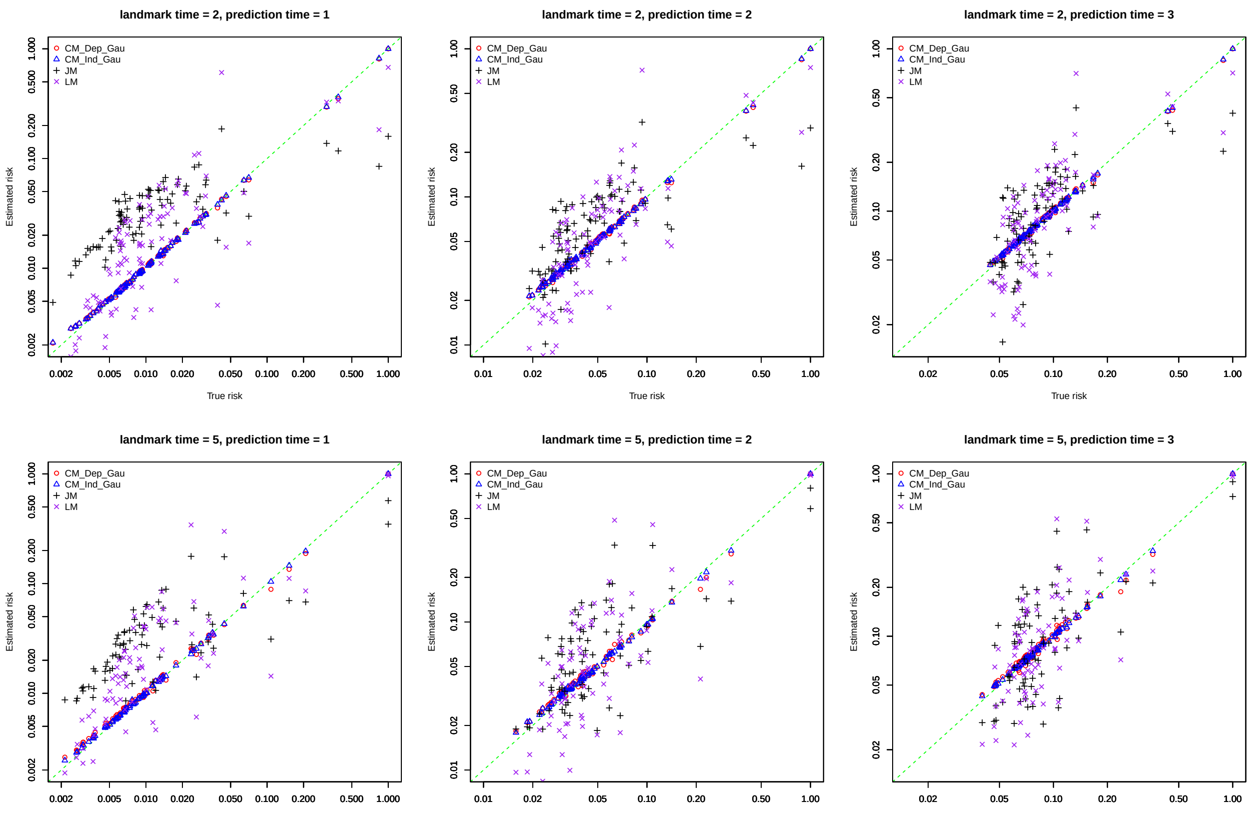

Figure S5: Predicted risks versus true risks in Scenario B2: CM with Gaussian kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

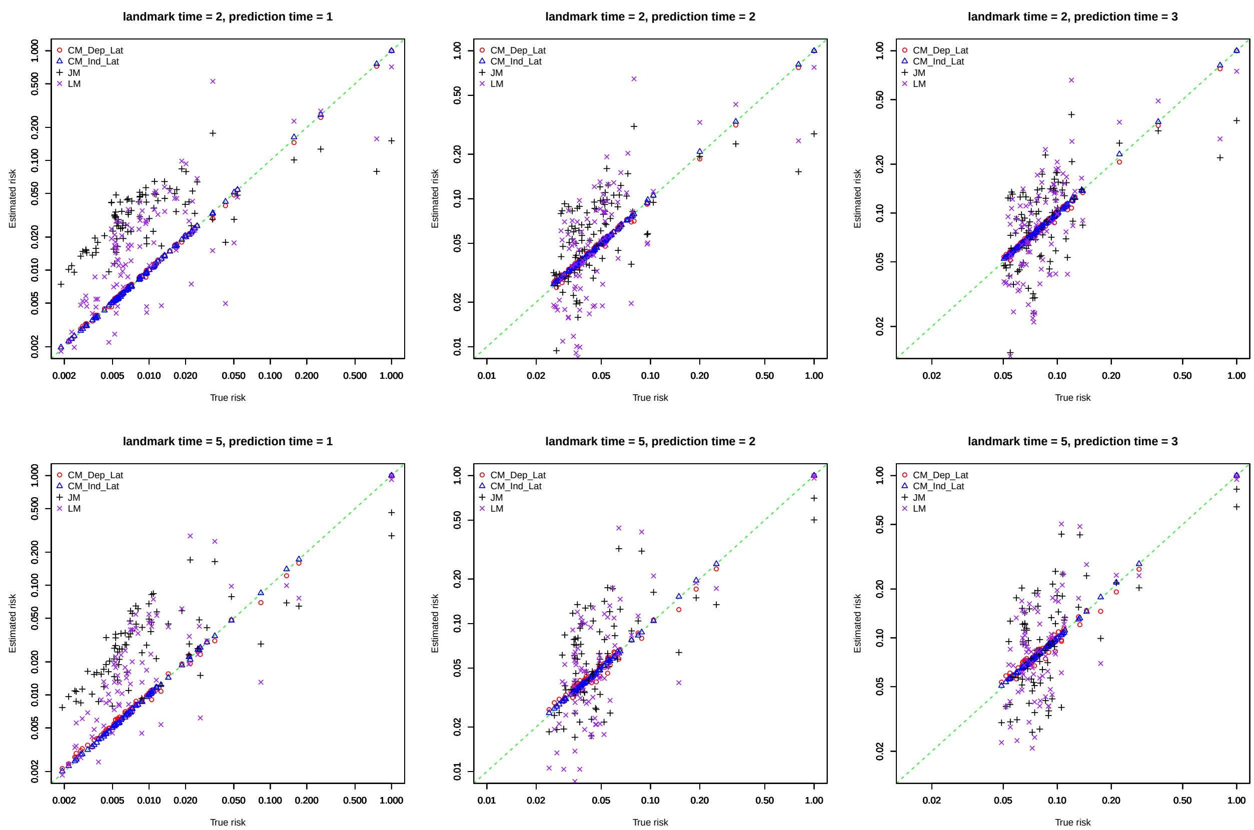

Figure S6: Predicted risks versus true risks in Scenario B3: CM with latent changepoint kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

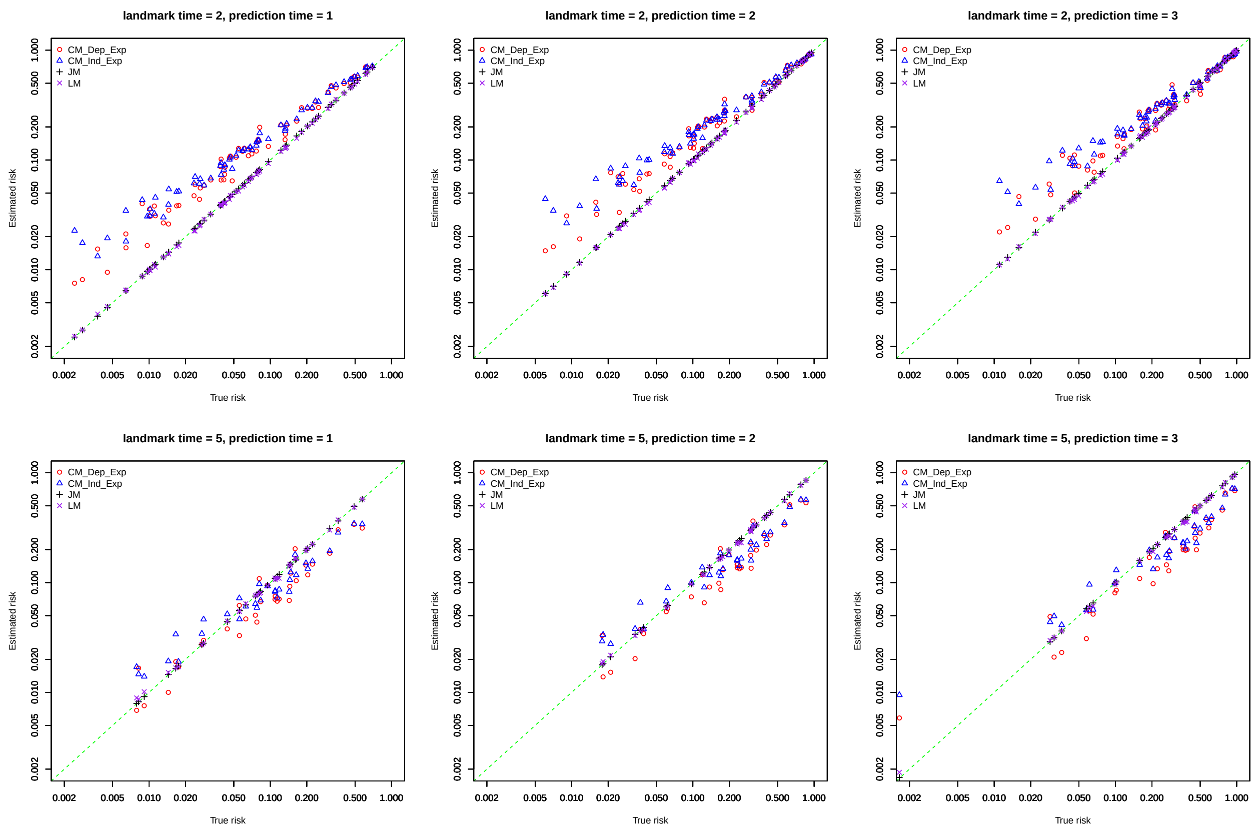

Figure S7: Predicted risks versus true risks in Scenario C: CM with exponential kernel under biomarker dependent and independent censoring assumptions, JM and LM are used to illustrate the comparison. Results were based on 200 simulated replicates.

4 Additional Simulations Using Low Disease Prevalence

4.1 Simulation Results for Scenarios A1, A2, and A3

Simulation results of the time-dependent AUCs and Brier scores for Scenario A1, A2, and A3, where CM_Dep_Exp, CM_Dep_Gau, and CM_Dep_Lat were the respective true models are presented in Table S9 and Table S10.

Table S9: Simulation results for Scenarios A1, A2, and A3, where CM_Dep_Exp, CM_Dep_Gau, and CM_Dep_Lat are the true models, respectively. The averaged time-dependent AUC and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
A1	CM_Dep_Exp	0.878 (0.053)	0.759 (0.039)	0.697 (0.037)	0.895 (0.047)	0.778 (0.045)	0.721 (0.040)
	CM_Dep_Gau	0.878 (0.053)	0.759 (0.041)	0.697 (0.037)	0.895 (0.046)	0.777 (0.045)	0.720 (0.041)
	CM_Dep_Lat	0.878 (0.052)	0.751 (0.041)	0.691 (0.037)	0.894 (0.047)	0.771 (0.045)	0.717 (0.040)
	CM_Ind_Exp	0.872 (0.054)	0.751 (0.041)	0.682 (0.039)	0.886 (0.053)	0.757 (0.047)	0.685 (0.043)
	CM_Ind_Gau	0.874 (0.053)	0.751 (0.042)	0.684 (0.039)	0.886 (0.052)	0.758 (0.048)	0.686 (0.043)
	CM_Ind_Lat	0.875 (0.053)	0.747 (0.041)	0.680 (0.037)	0.887 (0.052)	0.750 (0.044)	0.678 (0.041)
	JM	0.809 (0.063)	0.706 (0.042)	0.649 (0.037)	0.823 (0.066)	0.708 (0.047)	0.648 (0.041)
	LM	0.803 (0.064)	0.698 (0.040)	0.642 (0.037)	0.824 (0.065)	0.700 (0.054)	0.646 (0.046)
A2	CM_Dep_Exp	0.889 (0.046)	0.755 (0.041)	0.698 (0.037)	0.899 (0.048)	0.773 (0.046)	0.714 (0.040)
	CM_Dep_Gau	0.890 (0.046)	0.756 (0.041)	0.699 (0.036)	0.898 (0.048)	0.773 (0.047)	0.714 (0.040)
	CM_Dep_Lat	0.890 (0.045)	0.751 (0.043)	0.694 (0.037)	0.899 (0.048)	0.771 (0.048)	0.715 (0.039)
	CM_Ind_Exp	0.883 (0.048)	0.743 (0.043)	0.679 (0.038)	0.887 (0.051)	0.744 (0.047)	0.673 (0.045)
	CM_Ind_Gau	0.886 (0.047)	0.745 (0.043)	0.682 (0.038)	0.887 (0.050)	0.745 (0.048)	0.674 (0.044)
	CM_Ind_Lat	0.887 (0.046)	0.745 (0.044)	0.682 (0.038)	0.889 (0.049)	0.742 (0.044)	0.674 (0.042)
	JM	0.812 (0.062)	0.694 (0.045)	0.640 (0.039)	0.816 (0.073)	0.694 (0.050)	0.637 (0.045)
	LM	0.808 (0.063)	0.687 (0.043)	0.633 (0.039)	0.816 (0.069)	0.690 (0.054)	0.633 (0.048)
A3	CM_Dep_Exp	0.900 (0.050)	0.727 (0.043)	0.678 (0.039)	0.905 (0.053)	0.750 (0.047)	0.701 (0.041)
	CM_Dep_Gau	0.901 (0.050)	0.729 (0.041)	0.679 (0.039)	0.905 (0.053)	0.753 (0.047)	0.702 (0.041)
	CM_Dep_Lat	0.902 (0.049)	0.731 (0.041)	0.679 (0.039)	0.908 (0.053)	0.753 (0.048)	0.702 (0.041)
	CM_Ind_Exp	0.899 (0.051)	0.711 (0.048)	0.658 (0.042)	0.895 (0.057)	0.715 (0.045)	0.659 (0.038)
	CM_Ind_Gau	0.900 (0.050)	0.716 (0.046)	0.665 (0.040)	0.897 (0.055)	0.720 (0.045)	0.663 (0.038)
	CM_Ind_Lat	0.901 (0.049)	0.722 (0.043)	0.668 (0.040)	0.898 (0.056)	0.724 (0.044)	0.664 (0.039)
	JM	0.816 (0.065)	0.673 (0.054)	0.622 (0.046)	0.824 (0.069)	0.679 (0.048)	0.627 (0.039)
	LM	0.815 (0.061)	0.664 (0.052)	0.616 (0.045)	0.829 (0.069)	0.679 (0.050)	0.627 (0.041)

4.2 Simulation Results for Scenarios B1, B2, and B3

Simulation results of the time-dependent AUCs and Brier scores for Scenario B1, B2, and B3, where CM_Ind_Exp, CM_Ind_Gau, and CM_Ind_Lat were the respective true models are presented in Table S11 and Table S12.

Table S10: Simulation results for Scenarios A1, A2, and A3, where CM_Dep_Exp, CM_Dep_Gau, and CM_Dep_Lat are the true models, respectively. The averaged Brier scores and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
A1	CM_Dep_Exp	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Dep_Gau	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Dep_Lat	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Exp	0.002 (0.001)	0.007 (0.002)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Gau	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Lat	0.002 (0.001)	0.007 (0.002)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	JM	0.005 (0.001)	0.009 (0.002)	0.014 (0.002)	0.004 (0.001)	0.009 (0.001)	0.013 (0.002)
	LM	0.004 (0.001)	0.008 (0.002)	0.013 (0.002)	0.004 (0.001)	0.009 (0.001)	0.013 (0.002)
A2	CM_Dep_Exp	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Dep_Gau	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Dep_Lat	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Exp	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Gau	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Lat	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)	0.002 (0.001)	0.007 (0.001)	0.012 (0.002)
	JM	0.004 (0.001)	0.009 (0.002)	0.014 (0.002)	0.004 (0.001)	0.009 (0.002)	0.013 (0.002)
	LM	0.003 (0.001)	0.008 (0.001)	0.013 (0.002)	0.004 (0.001)	0.009 (0.002)	0.013 (0.002)
A3	CM_Dep_Exp	0.002 (0.001)	0.006 (0.001)	0.011 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Dep_Gau	0.002 (0.001)	0.006 (0.001)	0.011 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Dep_Lat	0.002 (0.001)	0.006 (0.001)	0.011 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Exp	0.002 (0.001)	0.006 (0.001)	0.011 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Gau	0.002 (0.001)	0.006 (0.001)	0.011 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	CM_Ind_Lat	0.002 (0.001)	0.006 (0.001)	0.011 (0.002)	0.002 (0.001)	0.007 (0.001)	0.011 (0.002)
	JM	0.004 (0.001)	0.009 (0.002)	0.013 (0.002)	0.004 (0.001)	0.009 (0.001)	0.014 (0.002)
	LM	0.003 (0.001)	0.008 (0.002)	0.013 (0.002)	0.003 (0.001)	0.008 (0.001)	0.013 (0.002)

4.3 Simulation Results for Scenario C

Simulation results of the time-dependent AUCs and Brier scores for Scenario C, where JM was the true model are presented in Table S13.

References

Table S11: Simulation results for Scenarios B1, B2, and B3, where CM_Ind_Exp, CM_Ind_Gau, and CM_Ind_Lat are the true models, respectively. The averaged time-dependent AUC and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s=2$			$s=5$		
		$t=1$	$t=2$	$t=3$	$t=1$	$t=2$	$t=3$
B1	CM_Dep_Exp	0.865 (0.056)	0.742 (0.050)	0.669 (0.043)	0.875 (0.053)	0.753 (0.049)	0.679 (0.043)
	CM_Dep_Gau	0.864 (0.056)	0.742 (0.050)	0.668 (0.043)	0.875 (0.054)	0.752 (0.050)	0.678 (0.043)
	CM_Dep_Lat	0.864 (0.055)	0.736 (0.051)	0.664 (0.043)	0.875 (0.054)	0.745 (0.049)	0.674 (0.043)
	CM_Ind_Exp	0.865 (0.056)	0.745 (0.050)	0.673 (0.041)	0.876 (0.055)	0.757 (0.049)	0.686 (0.042)
	CM_Ind_Gau	0.865 (0.056)	0.745 (0.049)	0.673 (0.041)	0.876 (0.055)	0.756 (0.050)	0.685 (0.043)
	CM_Ind_Lat	0.864 (0.056)	0.737 (0.051)	0.666 (0.041)	0.875 (0.056)	0.746 (0.050)	0.675 (0.043)
	JM	0.769 (0.074)	0.672 (0.054)	0.623 (0.038)	0.766 (0.084)	0.669 (0.061)	0.623 (0.047)
	LM	0.813 (0.062)	0.701 (0.049)	0.640 (0.037)	0.812 (0.059)	0.698 (0.047)	0.641 (0.040)
B2	CM_Dep_Exp	0.862 (0.059)	0.725 (0.052)	0.656 (0.044)	0.883 (0.053)	0.735 (0.049)	0.664 (0.046)
	CM_Dep_Gau	0.859 (0.058)	0.723 (0.049)	0.655 (0.043)	0.881 (0.054)	0.734 (0.048)	0.663 (0.044)
	CM_Dep_Lat	0.863 (0.058)	0.720 (0.052)	0.654 (0.043)	0.883 (0.053)	0.729 (0.047)	0.661 (0.046)
	CM_Ind_Exp	0.863 (0.059)	0.728 (0.051)	0.660 (0.043)	0.883 (0.053)	0.740 (0.049)	0.670 (0.044)
	CM_Ind_Gau	0.862 (0.058)	0.727 (0.050)	0.660 (0.042)	0.883 (0.054)	0.741 (0.048)	0.670 (0.044)
	CM_Ind_Lat	0.863 (0.058)	0.724 (0.052)	0.657 (0.042)	0.883 (0.054)	0.737 (0.045)	0.668 (0.043)
	JM	0.763 (0.074)	0.658 (0.054)	0.613 (0.041)	0.752 (0.095)	0.651 (0.058)	0.609 (0.047)
	LM	0.815 (0.062)	0.690 (0.051)	0.630 (0.041)	0.819 (0.063)	0.687 (0.048)	0.632 (0.041)
B3	CM_Dep_Exp	0.882 (0.053)	0.705 (0.054)	0.644 (0.047)	0.893 (0.049)	0.704 (0.047)	0.642 (0.039)
	CM_Dep_Gau	0.881 (0.053)	0.704 (0.054)	0.643 (0.046)	0.892 (0.050)	0.702 (0.049)	0.640 (0.043)
	CM_Dep_Lat	0.882 (0.053)	0.706 (0.053)	0.644 (0.046)	0.891 (0.050)	0.699 (0.050)	0.638 (0.043)
	CM_Ind_Exp	0.883 (0.053)	0.705 (0.054)	0.645 (0.045)	0.893 (0.050)	0.704 (0.048)	0.645 (0.039)
	CM_Ind_Gau	0.882 (0.053)	0.707 (0.055)	0.648 (0.045)	0.892 (0.050)	0.707 (0.047)	0.649 (0.036)
	CM_Ind_Lat	0.883 (0.054)	0.708 (0.052)	0.649 (0.044)	0.891 (0.050)	0.709 (0.046)	0.651 (0.036)
	JM	0.756 (0.079)	0.646 (0.057)	0.603 (0.041)	0.739 (0.092)	0.636 (0.058)	0.598 (0.043)
	LM	0.821 (0.065)	0.673 (0.055)	0.616 (0.043)	0.819 (0.057)	0.672 (0.050)	0.620 (0.041)

Table S12: Simulation results for Scenarios B1, B2, and B3, where CM_Ind_Exp, CM_Ind_Gau, and CM_Ind_Lat are the true models, respectively. The averaged Brier scores and standard deviation (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
B1	CM_Dep_Exp	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Dep_Gau	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Dep_Lat	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Exp	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Gau	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Lat	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	JM	0.005 (0.001)	0.009 (0.002)	0.014 (0.002)	0.005 (0.001)	0.009 (0.002)	0.014 (0.002)
	LM	0.004 (0.001)	0.009 (0.001)	0.013 (0.002)	0.004 (0.001)	0.009 (0.001)	0.013 (0.002)
B2	CM_Dep_Exp	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Dep_Gau	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Dep_Lat	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Exp	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Gau	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Lat	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	JM	0.005 (0.001)	0.009 (0.002)	0.014 (0.002)	0.005 (0.001)	0.009 (0.002)	0.014 (0.002)
	LM	0.004 (0.001)	0.009 (0.001)	0.013 (0.002)	0.004 (0.001)	0.009 (0.001)	0.013 (0.002)
B3	CM_Dep_Exp	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Dep_Gau	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Dep_Lat	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Exp	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Gau	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	CM_Ind_Lat	0.003 (0.001)	0.008 (0.001)	0.012 (0.002)	0.003 (0.001)	0.007 (0.001)	0.012 (0.002)
	JM	0.004 (0.001)	0.009 (0.002)	0.014 (0.002)	0.005 (0.001)	0.009 (0.002)	0.014 (0.002)
	LM	0.004 (0.001)	0.008 (0.001)	0.013 (0.002)	0.004 (0.001)	0.009 (0.002)	0.013 (0.002)

Table S13: Simulation results for Scenario C, where JM is the true model. The averaged time-dependent AUC and Brier score as well as the associated standard deviations (in parentheses) are based on 200 simulated replicates. Two landmark times $s = 2, 5$ and three prediction horizons $t = 1, 2, 3$ are used.

Scenario	Method	$s = 2$			$s = 5$		
		$t = 1$	$t = 2$	$t = 3$	$t = 1$	$t = 2$	$t = 3$
AUC	CM_Dep_Exp	0.887 (0.037)	0.882 (0.022)	0.881 (0.018)	0.864 (0.033)	0.864 (0.022)	0.863 (0.020)
	CM_Dep_Gau	0.888 (0.037)	0.884 (0.022)	0.883 (0.018)	0.865 (0.033)	0.865 (0.022)	0.864 (0.020)
	CM_Dep_Lat	0.888 (0.036)	0.885 (0.021)	0.883 (0.018)	0.865 (0.033)	0.865 (0.021)	0.864 (0.019)
	CM_Ind_Exp	0.892 (0.037)	0.885 (0.025)	0.881 (0.023)	0.868 (0.037)	0.870 (0.031)	0.868 (0.032)
	CM_Ind_Gau	0.893 (0.037)	0.887 (0.025)	0.885 (0.023)	0.870 (0.039)	0.870 (0.033)	0.868 (0.032)
	CM_Ind_Lat	0.896 (0.036)	0.891 (0.021)	0.889 (0.018)	0.873 (0.032)	0.874 (0.020)	0.872 (0.018)
	JM	0.897 (0.035)	0.892 (0.021)	0.890 (0.018)	0.877 (0.033)	0.878 (0.020)	0.878 (0.018)
	LM	0.896 (0.036)	0.892 (0.021)	0.890 (0.018)	0.876 (0.032)	0.877 (0.020)	0.878 (0.018)
Brier	CM_Dep_Exp	0.006 (0.001)	0.013 (0.002)	0.019 (0.002)	0.011 (0.002)	0.020 (0.003)	0.028 (0.003)
	CM_Dep_Gau	0.006 (0.001)	0.013 (0.002)	0.019 (0.002)	0.011 (0.002)	0.020 (0.003)	0.028 (0.003)
	CM_Dep_Lat	0.006 (0.001)	0.013 (0.002)	0.019 (0.002)	0.011 (0.002)	0.020 (0.003)	0.028 (0.003)
	CM_Ind_Exp	0.006 (0.001)	0.013 (0.002)	0.019 (0.003)	0.011 (0.002)	0.021 (0.003)	0.029 (0.005)
	CM_Ind_Gau	0.006 (0.001)	0.013 (0.002)	0.019 (0.002)	0.011 (0.002)	0.020 (0.003)	0.028 (0.004)
	CM_Ind_Lat	0.006 (0.001)	0.013 (0.002)	0.019 (0.002)	0.011 (0.002)	0.020 (0.003)	0.028 (0.003)
	JM	0.006 (0.001)	0.012 (0.002)	0.018 (0.002)	0.011 (0.002)	0.020 (0.002)	0.028 (0.003)
	LM	0.006 (0.001)	0.012 (0.002)	0.018 (0.002)	0.011 (0.002)	0.020 (0.002)	0.028 (0.003)