## APPENDIX

We find that as the $\epsilon$-perturbation magnitude increases from 0 to 1 for the worst-case adversarial attack, the relative percentage change from DRAFT to the adversarial training methods becomes larger and then smaller. The relative percent changes in CI from the DRAFT training objective to SAWAR training objective is shown in Table IV (where higher percentage change is better). We note that for very large $\epsilon$, since our data is standard normalized all methods begin to fail.

| $\epsilon$ | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| %$\Delta$ | 72.8 | 79.69 | 92.54 | 90.82 | 81.56 | 66.21 | 41.01 | 12.83 | 3.19 | 1.88 | 1.72 | 1.6 |

TABLE IV: The relative percent change in the Concordance Index metric from the DRAFT model to the SAWAR training objective averaged across the *SurvSet* datasets for the worst-case adversarial attack. A higher relative percent change is better.

| Dataset | $\epsilon$ / Algorithm | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aids2 | DRAFT | 0.516 | 0.519 | 0.522 | 0.525 | 0.527 | 0.53 | 0.536 | 0.551 | 0.566 | 0.572 | 0.572 | 0.57 |
| | Noise | 0.513 | 0.515 | 0.518 | 0.521 | 0.525 | 0.529 | 0.535 | 0.548 | 0.568 | 0.571 | 0.57 | 0.569 |
| | FGSM | 0.512 | 0.516 | 0.52 | 0.523 | 0.526 | 0.532 | 0.537 | 0.55 | 0.565 | 0.569 | 0.568 | 0.566 |
| | PGD | 0.506 | 0.509 | 0.513 | 0.518 | 0.523 | 0.528 | 0.535 | 0.552 | 0.567 | 0.569 | 0.568 | 0.567 |
| | AAE-Cox | 0.504 | 0.508 | 0.507 | 0.506 | 0.505 | 0.501 | 0.499 | 0.504 | 0.51 | 0.561 | 0.573 | 0.573 |
| | SAWAR | 0.565 | 0.568 | 0.568 | 0.569 | 0.569 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.569 | 0.569 |
| Framingham | DRAFT | 0.618 | 0.634 | 0.649 | 0.663 | 0.676 | 0.688 | 0.699 | 0.708 | 0.716 | 0.72 | 0.721 | 0.722 |
| | Noise | 0.606 | 0.622 | 0.637 | 0.653 | 0.666 | 0.679 | 0.691 | 0.703 | 0.713 | 0.718 | 0.719 | 0.719 |
| | FGSM | 0.582 | 0.598 | 0.611 | 0.626 | 0.641 | 0.655 | 0.671 | 0.691 | 0.708 | 0.715 | 0.715 | 0.715 |
| | PGD | 0.539 | 0.559 | 0.582 | 0.605 | 0.627 | 0.647 | 0.669 | 0.693 | 0.71 | 0.717 | 0.717 | 0.717 |
| | AAE-Cox | 0.514 | 0.522 | 0.529 | 0.533 | 0.539 | 0.553 | 0.569 | 0.57 | 0.582 | 0.73 | 0.733 | 0.733 |
| | SAWAR | 0.721 | 0.725 | 0.729 | 0.731 | 0.733 | 0.734 | 0.735 | 0.736 | 0.736 | 0.737 | 0.737 | 0.737 |
| LeukSurv | DRAFT | 0.589 | 0.593 | 0.596 | 0.598 | 0.601 | 0.602 | 0.608 | 0.62 | 0.63 | 0.632 | 0.633 | 0.633 |
| | Noise | 0.545 | 0.548 | 0.545 | 0.547 | 0.551 | 0.56 | 0.581 | 0.609 | 0.63 | 0.628 | 0.626 | 0.624 |
| | FGSM | 0.511 | 0.514 | 0.52 | 0.525 | 0.535 | 0.549 | 0.579 | 0.612 | 0.637 | 0.638 | 0.636 | 0.635 |
| | PGD | 0.498 | 0.498 | 0.501 | 0.51 | 0.521 | 0.543 | 0.576 | 0.616 | 0.64 | 0.643 | 0.64 | 0.638 |
| | AAE-Cox | 0.559 | 0.552 | 0.542 | 0.555 | 0.548 | 0.55 | 0.548 | 0.537 | 0.545 | 0.631 | 0.658 | 0.656 |
| | SAWAR | 0.495 | 0.51 | 0.524 | 0.536 | 0.552 | 0.57 | 0.588 | 0.609 | 0.633 | 0.658 | 0.669 | 0.673 |
| TRACE | DRAFT | 0.581 | 0.605 | 0.633 | 0.66 | 0.685 | 0.708 | 0.726 | 0.736 | 0.741 | 0.743 | 0.744 | 0.745 |
| | Noise | 0.576 | 0.598 | 0.621 | 0.645 | 0.669 | 0.691 | 0.712 | 0.728 | 0.737 | 0.742 | 0.744 | 0.745 |
| | FGSM | 0.581 | 0.603 | 0.629 | 0.653 | 0.674 | 0.697 | 0.717 | 0.732 | 0.739 | 0.743 | 0.744 | 0.744 |
| | PGD | 0.571 | 0.595 | 0.621 | 0.646 | 0.668 | 0.691 | 0.714 | 0.73 | 0.739 | 0.743 | 0.744 | 0.745 |
| | AAE-Cox | 0.432 | 0.44 | 0.447 | 0.451 | 0.46 | 0.47 | 0.489 | 0.524 | 0.628 | 0.743 | 0.746 | 0.747 |
| | SAWAR | 0.714 | 0.722 | 0.728 | 0.733 | 0.735 | 0.737 | 0.739 | 0.742 | 0.744 | 0.746 | 0.747 | 0.747 |
| dataDIVAT1 | DRAFT | 0.573 | 0.585 | 0.598 | 0.611 | 0.625 | 0.636 | 0.646 | 0.653 | 0.657 | 0.657 | 0.656 | 0.655 |
| | Noise | 0.532 | 0.541 | 0.552 | 0.562 | 0.575 | 0.589 | 0.603 | 0.619 | 0.631 | 0.636 | 0.635 | 0.635 |
| | FGSM | 0.546 | 0.555 | 0.567 | 0.578 | 0.588 | 0.6 | 0.612 | 0.626 | 0.641 | 0.647 | 0.646 | 0.646 |
| | PGD | 0.523 | 0.534 | 0.545 | 0.557 | 0.569 | 0.581 | 0.599 | 0.621 | 0.641 | 0.648 | 0.648 | 0.648 |
| | AAE-Cox | 0.597 | 0.589 | 0.589 | 0.585 | 0.58 | 0.571 | 0.571 | 0.566 | 0.596 | 0.662 | 0.663 | 0.663 |
| | SAWAR | 0.64 | 0.645 | 0.649 | 0.654 | 0.658 | 0.661 | 0.664 | 0.665 | 0.667 | 0.668 | 0.669 | 0.67 |
| flchain | DRAFT | 0.109 | 0.111 | 0.115 | 0.122 | 0.133 | 0.158 | 0.239 | 0.566 | 0.905 | 0.917 | 0.92 | 0.921 |
| | Noise | 0.166 | 0.131 | 0.111 | 0.123 | 0.149 | 0.224 | 0.433 | 0.792 | 0.911 | 0.917 | 0.919 | 0.918 |
| | FGSM | 0.115 | 0.153 | 0.245 | 0.431 | 0.72 | 0.885 | 0.91 | 0.914 | 0.918 | 0.922 | 0.922 | 0.922 |
| | PGD | 0.165 | 0.268 | 0.457 | 0.744 | 0.876 | 0.904 | 0.912 | 0.917 | 0.92 | 0.923 | 0.923 | 0.923 |
| | AAE-Cox | 0.527 | 0.648 | 0.668 | 0.553 | 0.394 | 0.511 | 0.51 | 0.476 | 0.11 | 0.179 | 0.925 | 0.926 |
| | SAWAR | 0.593 | 0.684 | 0.866 | 0.918 | 0.922 | 0.925 | 0.926 | 0.927 | 0.927 | 0.927 | 0.927 | 0.927 |
| prostate | DRAFT | 0.402 | 0.416 | 0.428 | 0.444 | 0.469 | 0.505 | 0.542 | 0.585 | 0.627 | 0.653 | 0.661 | 0.668 |
| | Noise | 0.433 | 0.44 | 0.448 | 0.451 | 0.463 | 0.48 | 0.492 | 0.511 | 0.537 | 0.558 | 0.561 | 0.562 |
| | FGSM | 0.448 | 0.453 | 0.46 | 0.465 | 0.475 | 0.486 | 0.502 | 0.515 | 0.541 | 0.564 | 0.569 | 0.571 |
| | PGD | 0.447 | 0.455 | 0.459 | 0.467 | 0.474 | 0.487 | 0.509 | 0.53 | 0.564 | 0.585 | 0.588 | 0.588 |
| | AAE-Cox | 0.41 | 0.411 | 0.406 | 0.41 | 0.407 | 0.403 | 0.399 | 0.391 | 0.414 | 0.646 | 0.686 | 0.691 |
| | SAWAR | 0.608 | 0.623 | 0.637 | 0.652 | 0.665 | 0.671 | 0.672 | 0.673 | 0.667 | 0.663 | 0.66 | 0.657 |
| retinopathy | DRAFT | 0.553 | 0.568 | 0.578 | 0.597 | 0.616 | 0.632 | 0.645 | 0.653 | 0.663 | 0.666 | 0.667 | 0.669 |
| | Noise | 0.573 | 0.591 | 0.605 | 0.62 | 0.632 | 0.644 | 0.653 | 0.661 | 0.666 | 0.667 | 0.668 | 0.668 |
| | FGSM | 0.575 | 0.592 | 0.604 | 0.615 | 0.625 | 0.633 | 0.642 | 0.647 | 0.651 | 0.656 | 0.657 | 0.659 |
| | PGD | 0.571 | 0.589 | 0.599 | 0.61 | 0.621 | 0.63 | 0.64 | 0.647 | 0.651 | 0.655 | 0.656 | 0.657 |
| | AAE-Cox | 0.494 | 0.495 | 0.506 | 0.504 | 0.514 | 0.564 | 0.577 | 0.592 | 0.62 | 0.657 | 0.652 | 0.648 |
| | SAWAR | 0.668 | 0.669 | 0.67 | 0.666 | 0.662 | 0.66 | 0.656 | 0.654 | 0.653 | 0.65 | 0.648 | 0.647 |
| stagec | DRAFT | 0.358 | 0.378 | 0.382 | 0.406 | 0.425 | 0.449 | 0.454 | 0.475 | 0.489 | 0.504 | 0.507 | 0.512 |
| | Noise | 0.353 | 0.373 | 0.39 | 0.407 | 0.436 | 0.466 | 0.485 | 0.5 | 0.53 | 0.544 | 0.549 | 0.555 |
| | FGSM | 0.329 | 0.346 | 0.368 | 0.389 | 0.416 | 0.429 | 0.443 | 0.471 | 0.488 | 0.502 | 0.503 | 0.51 |
| | PGD | 0.341 | 0.352 | 0.381 | 0.399 | 0.419 | 0.431 | 0.442 | 0.47 | 0.49 | 0.496 | 0.498 | 0.505 |
| | AAE-Cox | 0.393 | 0.397 | 0.397 | 0.411 | 0.417 | 0.409 | 0.405 | 0.429 | 0.469 | 0.523 | 0.543 | 0.54 |
| | SAWAR | 0.393 | 0.401 | 0.413 | 0.425 | 0.436 | 0.461 | 0.488 | 0.506 | 0.534 | 0.543 | 0.548 | 0.558 |
| zinc | DRAFT | 0.262 | 0.27 | 0.284 | 0.296 | 0.317 | 0.355 | 0.44 | 0.579 | 0.712 | 0.755 | 0.765 | 0.77 |
| | Noise | 0.318 | 0.328 | 0.343 | 0.366 | 0.401 | 0.466 | 0.562 | 0.661 | 0.734 | 0.766 | 0.773 | 0.776 |
| | FGSM | 0.377 | 0.403 | 0.439 | 0.49 | 0.557 | 0.626 | 0.685 | 0.737 | 0.762 | 0.78 | 0.782 | 0.783 |
| | PGD | 0.384 | 0.406 | 0.443 | 0.495 | 0.559 | 0.632 | 0.695 | 0.741 | 0.77 | 0.778 | 0.78 | 0.781 |
| | AAE-Cox | 0.226 | 0.231 | 0.228 | 0.236 | 0.234 | 0.249 | 0.265 | 0.306 | 0.445 | 0.724 | 0.754 | 0.759 |
| | SAWAR | 0.667 | 0.725 | 0.763 | 0.785 | 0.785 | 0.785 | 0.781 | 0.778 | 0.778 | 0.776 | 0.776 | 0.774 |

TABLE V: Concordance Index metric for *SurvSet* datasets (higher is better) for each adversarial training method against the worst-case adversarial attack.

We find that as the $\epsilon$-perturbation magnitude increases from 0 to 1 for the worst-case adversarial attack, the relative percentage change from DRAFT to the adversarial training methods becomes larger and then smaller. The relative percent changes in Integrated Brier Score metric from the DRAFT training objective to SAWAR training objective is shown in Table VI (where lower percentage change is better). We note that for very large $\epsilon$, since our data is standard normalized all methods begin to fail.

| $\epsilon$ | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| %$\Delta$ | -37.55 | -42.51 | -48.08 | -53.15 | -55.48 | -55.34 | -51.51 | -42.94 | -28.8 | -10.87 | -4.78 | -0.65 |

TABLE VI: The relative percent change in Integrated Brier Score metric from the DRAFT model to the SAWAR training objective averaged across the *SurvSet* datasets for the worst-case adversarial attack. A lower relative percent change is better.

| Dataset | $\epsilon$ / Algorithm | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aids2 | DRAFT | 0.265 | 0.262 | 0.258 | 0.252 | 0.242 | 0.228 | 0.207 | 0.18 | 0.151 | 0.138 | 0.137 | 0.137 |
| | Noise | 0.266 | 0.264 | 0.261 | 0.255 | 0.246 | 0.231 | 0.209 | 0.179 | 0.15 | 0.138 | 0.137 | 0.138 |
| | FGSM | 0.265 | 0.263 | 0.258 | 0.251 | 0.239 | 0.221 | 0.197 | 0.167 | 0.144 | 0.137 | 0.137 | 0.138 |
| | PGD | 0.265 | 0.262 | 0.257 | 0.248 | 0.235 | 0.216 | 0.19 | 0.161 | 0.141 | 0.137 | 0.138 | 0.138 |
| | AAE-Cox | 0.269 | 0.269 | 0.269 | 0.268 | 0.265 | 0.259 | 0.25 | 0.231 | 0.183 | 0.138 | 0.137 | 0.137 |
| | SAWAR | 0.14 | 0.139 | 0.138 | 0.138 | 0.137 | 0.137 | 0.137 | 0.137 | 0.137 | 0.137 | 0.137 | 0.137 |
| Framingham | DRAFT | 0.831 | 0.825 | 0.811 | 0.783 | 0.724 | 0.618 | 0.459 | 0.289 | 0.174 | 0.124 | 0.114 | 0.11 |
| | Noise | 0.836 | 0.834 | 0.83 | 0.82 | 0.79 | 0.709 | 0.543 | 0.331 | 0.185 | 0.126 | 0.115 | 0.11 |
| | FGSM | 0.836 | 0.836 | 0.835 | 0.831 | 0.817 | 0.765 | 0.605 | 0.336 | 0.162 | 0.118 | 0.113 | 0.112 |
| | PGD | 0.836 | 0.836 | 0.836 | 0.831 | 0.812 | 0.74 | 0.555 | 0.295 | 0.146 | 0.115 | 0.113 | 0.112 |
| | AAE-Cox | 0.836 | 0.836 | 0.836 | 0.836 | 0.836 | 0.836 | 0.834 | 0.775 | 0.385 | 0.116 | 0.109 | 0.108 |
| | SAWAR | 0.17 | 0.155 | 0.144 | 0.134 | 0.127 | 0.122 | 0.117 | 0.114 | 0.112 | 0.111 | 0.111 | 0.111 |
| LeukSurv | DRAFT | 0.206 | 0.206 | 0.205 | 0.205 | 0.203 | 0.2 | 0.195 | 0.185 | 0.17 | 0.158 | 0.154 | 0.153 |
| | Noise | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.2 | 0.171 | 0.166 | 0.173 |
| | FGSM | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.203 | 0.187 | 0.161 | 0.158 | 0.159 |
| | PGD | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.202 | 0.183 | 0.16 | 0.157 | 0.158 |
| | AAE-Cox | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.206 | 0.198 | 0.162 | 0.154 | 0.152 |
| | SAWAR | 0.194 | 0.19 | 0.184 | 0.178 | 0.171 | 0.165 | 0.16 | 0.155 | 0.151 | 0.148 | 0.147 | 0.146 |
| TRACE | DRAFT | 0.62 | 0.611 | 0.593 | 0.558 | 0.504 | 0.432 | 0.347 | 0.265 | 0.204 | 0.172 | 0.165 | 0.162 |
| | Noise | 0.627 | 0.626 | 0.623 | 0.611 | 0.579 | 0.518 | 0.426 | 0.317 | 0.225 | 0.176 | 0.166 | 0.162 |
| | FGSM | 0.627 | 0.625 | 0.619 | 0.596 | 0.545 | 0.46 | 0.351 | 0.248 | 0.188 | 0.167 | 0.163 | 0.162 |
| | PGD | 0.627 | 0.625 | 0.617 | 0.593 | 0.54 | 0.455 | 0.347 | 0.247 | 0.188 | 0.167 | 0.164 | 0.162 |
| | AAE-Cox | 0.627 | 0.627 | 0.627 | 0.627 | 0.627 | 0.623 | 0.588 | 0.471 | 0.284 | 0.172 | 0.165 | 0.163 |
| | SAWAR | 0.324 | 0.281 | 0.246 | 0.22 | 0.202 | 0.188 | 0.179 | 0.171 | 0.166 | 0.163 | 0.162 | 0.161 |
| dataDIVAT1 | DRAFT | 0.702 | 0.689 | 0.663 | 0.614 | 0.527 | 0.405 | 0.285 | 0.21 | 0.177 | 0.17 | 0.172 | 0.177 |
| | Noise | 0.72 | 0.72 | 0.719 | 0.718 | 0.713 | 0.689 | 0.599 | 0.4 | 0.245 | 0.197 | 0.193 | 0.195 |
| | FGSM | 0.719 | 0.719 | 0.718 | 0.714 | 0.697 | 0.637 | 0.478 | 0.285 | 0.2 | 0.182 | 0.182 | 0.184 |
| | PGD | 0.719 | 0.719 | 0.716 | 0.71 | 0.687 | 0.613 | 0.442 | 0.261 | 0.191 | 0.18 | 0.181 | 0.182 |
| | AAE-Cox | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.715 | 0.553 | 0.194 | 0.165 | 0.17 | 0.174 |
| | SAWAR | 0.189 | 0.184 | 0.181 | 0.179 | 0.177 | 0.177 | 0.177 | 0.177 | 0.177 | 0.178 | 0.179 | 0.179 |
| flchain | DRAFT | 0.816 | 0.816 | 0.816 | 0.816 | 0.816 | 0.816 | 0.814 | 0.797 | 0.46 | 0.093 | 0.069 | 0.054 |
| | Noise | 0.816 | 0.816 | 0.816 | 0.816 | 0.816 | 0.816 | 0.814 | 0.77 | 0.227 | 0.088 | 0.067 | 0.057 |
| | FGSM | 0.816 | 0.816 | 0.816 | 0.816 | 0.816 | 0.804 | 0.468 | 0.119 | 0.089 | 0.061 | 0.055 | 0.054 |
| | PGD | 0.817 | 0.817 | 0.817 | 0.816 | 0.81 | 0.638 | 0.162 | 0.107 | 0.076 | 0.057 | 0.054 | 0.053 |
| | AAE-Cox | nan | nan | nan | nan | nan | nan | nan | nan | 0.794 | 0.688 | 0.054 | 0.051 |
| | SAWAR | 0.445 | 0.363 | 0.241 | 0.094 | 0.067 | 0.059 | 0.057 | 0.055 | 0.054 | 0.053 | 0.053 | 0.053 |
| prostate | DRAFT | 0.517 | 0.517 | 0.516 | 0.513 | 0.508 | 0.495 | 0.466 | 0.408 | 0.322 | 0.234 | 0.202 | 0.181 |
| | Noise | 0.518 | 0.518 | 0.519 | 0.519 | 0.52 | 0.52 | 0.519 | 0.508 | 0.457 | 0.321 | 0.267 | 0.249 |
| | FGSM | 0.517 | 0.518 | 0.519 | 0.518 | 0.52 | 0.52 | 0.517 | 0.493 | 0.402 | 0.262 | 0.228 | 0.218 |
| | PGD | 0.518 | 0.518 | 0.518 | 0.518 | 0.517 | 0.518 | 0.515 | 0.486 | 0.383 | 0.248 | 0.219 | 0.209 |
| | AAE-Cox | 0.519 | 0.519 | 0.519 | 0.519 | 0.518 | 0.518 | 0.517 | 0.511 | 0.443 | 0.205 | 0.173 | 0.169 |
| | SAWAR | 0.37 | 0.334 | 0.291 | 0.262 | 0.236 | 0.218 | 0.204 | 0.192 | 0.184 | 0.178 | 0.176 | 0.175 |
| retinopathy | DRAFT | 0.728 | 0.722 | 0.71 | 0.687 | 0.647 | 0.579 | 0.48 | 0.364 | 0.266 | 0.204 | 0.188 | 0.179 |
| | Noise | 0.73 | 0.725 | 0.714 | 0.693 | 0.652 | 0.579 | 0.472 | 0.353 | 0.256 | 0.199 | 0.184 | 0.177 |
| | FGSM | 0.725 | 0.715 | 0.697 | 0.665 | 0.61 | 0.526 | 0.419 | 0.314 | 0.237 | 0.196 | 0.186 | 0.182 |
| | PGD | 0.724 | 0.714 | 0.695 | 0.662 | 0.606 | 0.521 | 0.413 | 0.309 | 0.235 | 0.195 | 0.186 | 0.182 |
| | AAE-Cox | 0.733 | 0.733 | 0.733 | 0.733 | 0.733 | 0.732 | 0.716 | 0.596 | 0.281 | 0.183 | 0.181 | 0.181 |
| | SAWAR | 0.588 | 0.548 | 0.499 | 0.44 | 0.378 | 0.317 | 0.265 | 0.224 | 0.197 | 0.184 | 0.181 | 0.181 |
| stagec | DRAFT | 0.556 | 0.549 | 0.544 | 0.543 | 0.539 | 0.517 | 0.468 | 0.404 | 0.332 | 0.274 | 0.256 | 0.245 |
| | Noise | 0.559 | 0.553 | 0.547 | 0.548 | 0.551 | 0.541 | 0.501 | 0.437 | 0.357 | 0.282 | 0.258 | 0.244 |
| | FGSM | 0.547 | 0.545 | 0.549 | 0.553 | 0.545 | 0.511 | 0.457 | 0.391 | 0.323 | 0.278 | 0.265 | 0.258 |
| | PGD | 0.547 | 0.546 | 0.549 | 0.553 | 0.542 | 0.507 | 0.453 | 0.388 | 0.322 | 0.278 | 0.267 | 0.26 |
| | AAE-Cox | 0.568 | 0.568 | 0.568 | 0.568 | 0.567 | 0.559 | 0.545 | 0.544 | 0.474 | 0.291 | 0.268 | 0.263 |
| | SAWAR | 0.521 | 0.497 | 0.469 | 0.436 | 0.401 | 0.365 | 0.334 | 0.303 | 0.276 | 0.256 | 0.249 | 0.243 |
| zinc | DRAFT | 0.847 | 0.847 | 0.846 | 0.843 | 0.831 | 0.787 | 0.641 | 0.376 | 0.184 | 0.119 | 0.109 | 0.107 |
| | Noise | 0.847 | 0.847 | 0.847 | 0.845 | 0.838 | 0.795 | 0.627 | 0.351 | 0.179 | 0.128 | 0.118 | 0.113 |
| | FGSM | 0.847 | 0.847 | 0.845 | 0.835 | 0.782 | 0.611 | 0.356 | 0.189 | 0.133 | 0.116 | 0.113 | 0.112 |
| | PGD | 0.847 | 0.847 | 0.845 | 0.834 | 0.777 | 0.6 | 0.341 | 0.182 | 0.132 | 0.116 | 0.113 | 0.112 |
| | AAE-Cox | 0.847 | 0.847 | 0.847 | 0.847 | 0.847 | 0.847 | 0.846 | 0.823 | 0.507 | 0.119 | 0.109 | 0.108 |
| | SAWAR | 0.654 | 0.532 | 0.401 | 0.289 | 0.21 | 0.161 | 0.133 | 0.118 | 0.111 | 0.109 | 0.109 | 0.109 |

TABLE VII: Integrated Brier Score metric for *SurvSet* datasets (lower is better) for each adversarial training method against the worst-case adversarial attack.

| Dataset | $\epsilon$ / Algorithm | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aids2 | DRAFT | 7.88e+05 | 2.75e+05 | 9.79e+04 | 3.51e+04 | 1.31e+04 | 5.06e+03 | 2.06e+03 | 9.59e+02 | 6.16e+02 | 5.45e+02 | 5.41e+02 | 5.41e+02 |
| | Noise | 3.15e+05 | 1.30e+05 | 5.45e+04 | 2.30e+04 | 9.53e+03 | 4.06e+03 | 1.79e+03 | 9.02e+02 | 6.06e+02 | 5.44e+02 | 5.41e+02 | 5.41e+02 |
| | FGSM | 1.29e+05 | 5.99e+04 | 2.79e+04 | 1.29e+04 | 5.92e+03 | 2.72e+03 | 1.32e+03 | 7.49e+02 | 5.69e+02 | 5.42e+02 | 5.41e+02 | 5.41e+02 |
| | PGD | 7.29e+04 | 3.62e+04 | 1.80e+04 | 8.83e+03 | 4.29e+03 | 2.10e+03 | 1.09e+03 | 6.82e+02 | 5.57e+02 | 5.42e+02 | 5.41e+02 | 5.41e+02 |
| | AAE-Cox | 6.04e+12 | 2.43e+11 | 1.30e+10 | 6.94e+08 | 4.08e+07 | 2.64e+06 | 1.76e+05 | 1.27e+04 | 1.18e+03 | 5.41e+02 | 5.38e+02 | 5.39e+02 |
| | SAWAR | 5.53e+02 | 5.48e+02 | 5.45e+02 | 5.43e+02 | 5.42e+02 | 5.42e+02 | 5.41e+02 | 5.41e+02 | 5.40e+02 | 5.40e+02 | 5.40e+02 | 5.40e+02 |
| Framingham | DRAFT | 2.24e+07 | 4.61e+06 | 9.70e+05 | 2.13e+05 | 4.98e+04 | 1.33e+04 | 4.62e+03 | 2.35e+03 | 1.71e+03 | 1.52e+03 | 1.49e+03 | 1.48e+03 |
| | Noise | 3.13e+07 | 6.71e+06 | 1.48e+06 | 3.35e+05 | 7.98e+04 | 2.05e+04 | 6.23e+03 | 2.67e+03 | 1.76e+03 | 1.53e+03 | 1.49e+03 | 1.48e+03 |
| | FGSM | 8.34e+09 | 7.44e+08 | 6.79e+07 | 6.46e+06 | 6.50e+05 | 7.31e+04 | 1.05e+04 | 2.77e+03 | 1.67e+03 | 1.50e+03 | 1.49e+03 | 1.48e+03 |
| | PGD | 1.53e+11 | 7.60e+09 | 3.88e+08 | 2.07e+07 | 1.20e+06 | 8.59e+04 | 9.43e+03 | 2.46e+03 | 1.61e+03 | 1.49e+03 | 1.48e+03 | 1.48e+03 |
| | AAE-Cox | 1.38e+26 | 1.22e+23 | 1.20e+20 | 1.10e+17 | 1.21e+14 | 1.26e+11 | 1.63e+08 | 3.73e+05 | 3.68e+03 | 1.49e+03 | 1.47e+03 | 1.47e+03 |
| | SAWAR | 1.67e+03 | 1.62e+03 | 1.58e+03 | 1.55e+03 | 1.53e+03 | 1.51e+03 | 1.50e+03 | 1.49e+03 | 1.48e+03 | 1.48e+03 | 1.48e+03 | 1.48e+03 |
| LeukSurv | DRAFT | 2.10e+08 | 3.80e+07 | 7.18e+06 | 1.29e+06 | 2.41e+05 | 4.59e+04 | 9.21e+03 | 2.13e+03 | 6.86e+02 | 3.75e+02 | 3.28e+02 | 3.07e+02 |
| | Noise | 1.40e+20 | 1.48e+18 | 1.45e+16 | 1.63e+14 | 1.29e+12 | 9.53e+09 | 8.92e+07 | 1.13e+06 | 2.90e+04 | 2.62e+03 | 1.25e+03 | 7.75e+02 |
| | FGSM | 6.24e+12 | 4.01e+11 | 2.30e+10 | 1.27e+09 | 7.06e+07 | 4.34e+06 | 2.73e+05 | 2.04e+04 | 2.18e+03 | 5.11e+02 | 3.72e+02 | 3.25e+02 |
| | PGD | 4.11e+11 | 3.30e+10 | 2.53e+09 | 1.99e+08 | 1.58e+07 | 1.30e+06 | 1.12e+05 | 1.10e+04 | 1.50e+03 | 4.34e+02 | 3.39e+02 | 3.07e+02 |
| | AAE-Cox | 4.24e+28 | 2.71e+25 | 1.61e+34 | 7.46e+29 | 2.45e+25 | 7.92e+19 | 7.26e+14 | 3.55e+09 | 1.15e+05 | 4.18e+02 | 2.99e+02 | 2.84e+02 |
| | SAWAR | 3.30e+03 | 2.00e+03 | 1.23e+03 | 7.95e+02 | 5.43e+02 | 3.97e+02 | 3.38e+02 | 3.06e+02 | 2.87e+02 | 2.75e+02 | 2.72e+02 | 2.70e+02 |
| TRACE | DRAFT | 5.09e+05 | 1.75e+05 | 6.15e+04 | 2.23e+04 | 8.34e+03 | 3.31e+03 | 1.48e+03 | 8.34e+02 | 6.09e+02 | 5.38e+02 | 5.27e+02 | 5.24e+02 |
| | Noise | 2.14e+09 | 2.12e+08 | 2.24e+07 | 2.58e+06 | 3.25e+05 | 4.62e+04 | 7.86e+03 | 1.89e+03 | 7.98e+02 | 5.76e+02 | 5.46e+02 | 5.35e+02 |
| | FGSM | 4.68e+08 | 4.01e+07 | 3.85e+06 | 4.31e+05 | 5.82e+04 | 9.91e+03 | 2.30e+03 | 8.91e+02 | 6.03e+02 | 5.39e+02 | 5.31e+02 | 5.28e+02 |
| | PGD | 4.42e+07 | 6.51e+06 | 1.04e+06 | 1.82e+05 | 3.49e+04 | 7.47e+03 | 2.01e+03 | 8.54e+02 | 5.99e+02 | 5.39e+02 | 5.31e+02 | 5.27e+02 |
| | AAE-Cox | 1.06e+24 | 1.53e+21 | 2.08e+18 | 2.78e+15 | 2.40e+12 | 2.92e+09 | 5.29e+06 | 2.86e+04 | 9.75e+02 | 5.41e+02 | 5.31e+02 | 5.29e+02 |
| | SAWAR | 1.49e+03 | 1.01e+03 | 7.74e+02 | 6.57e+02 | 5.98e+02 | 5.67e+02 | 5.48e+02 | 5.35e+02 | 5.28e+02 | 5.24e+02 | 5.24e+02 | 5.24e+02 |
| dataDIVAT1 | DRAFT | 2.97e+04 | 1.56e+04 | 8.36e+03 | 4.56e+03 | 2.59e+03 | 1.59e+03 | 1.11e+03 | 8.83e+02 | 7.91e+02 | 7.56e+02 | 7.51e+02 | 7.50e+02 |
| | Noise | 1.60e+10 | 1.12e+09 | 8.30e+07 | 6.62e+06 | 5.83e+05 | 5.99e+04 | 8.13e+03 | 1.87e+03 | 9.38e+02 | 7.78e+02 | 7.61e+02 | 7.59e+02 |
| | FGSM | 3.25e+08 | 3.59e+07 | 4.13e+06 | 5.10e+05 | 7.07e+04 | 1.17e+04 | 2.66e+03 | 1.10e+03 | 8.11e+02 | 7.58e+02 | 7.53e+02 | 7.52e+02 |
| | PGD | 1.22e+08 | 1.55e+07 | 2.06e+06 | 2.92e+05 | 4.56e+04 | 8.39e+03 | 2.15e+03 | 1.01e+03 | 7.94e+02 | 7.55e+02 | 7.52e+02 | 7.51e+02 |
| | AAE-Cox | 9.96e+18 | 6.79e+16 | 3.12e+14 | 1.88e+12 | 1.37e+10 | 1.14e+08 | 1.05e+06 | 1.57e+04 | 1.04e+03 | 7.50e+02 | 7.45e+02 | 7.45e+02 |
| | SAWAR | 7.89e+02 | 7.79e+02 | 7.70e+02 | 7.63e+02 | 7.58e+02 | 7.54e+02 | 7.51e+02 | 7.49e+02 | 7.47e+02 | 7.46e+02 | 7.46e+02 | 7.46e+02 |
| flchain | DRAFT | 1.57e+22 | 5.59e+19 | 2.03e+17 | 7.97e+14 | 3.37e+12 | 1.52e+10 | 7.49e+07 | 5.25e+05 | 1.45e+04 | 1.95e+03 | 1.25e+03 | 1.10e+03 |
| | Noise | 2.69e+32 | 2.90e+28 | 3.20e+24 | 5.94e+33 | 2.08e+27 | 7.50e+20 | 3.25e+14 | 2.31e+08 | 6.25e+04 | 2.40e+03 | 1.47e+03 | 1.24e+03 |
| | FGSM | 5.19e+19 | 7.59e+16 | 1.21e+14 | 2.16e+11 | 7.32e+08 | 9.31e+06 | 2.85e+05 | 1.58e+04 | 2.16e+03 | 1.18e+03 | 1.12e+03 | 1.10e+03 |
| | PGD | 3.10e+15 | 1.18e+13 | 6.11e+10 | 6.20e+08 | 1.63e+07 | 6.61e+05 | 3.81e+04 | 4.41e+03 | 1.43e+03 | 1.12e+03 | 1.09e+03 | 1.09e+03 |
| | AAE-Cox | nan | nan | nan | nan | nan | nan | nan | nan | 4.02e+33 | 2.23e+10 | 1.11e+03 | 1.08e+03 |
| | SAWAR | 5.84e+05 | 3.37e+04 | 4.04e+03 | 1.74e+03 | 1.31e+03 | 1.18e+03 | 1.13e+03 | 1.11e+03 | 1.10e+03 | 1.09e+03 | 1.09e+03 | 1.09e+03 |
| prostate | DRAFT | 5.92e+05 | 2.18e+05 | 8.11e+04 | 3.04e+04 | 1.16e+04 | 4.49e+03 | 1.83e+03 | 8.39e+02 | 4.86e+02 | 3.71e+02 | 3.48e+02 | 3.37e+02 |
| | Noise | 6.55e+23 | 1.63e+21 | 4.14e+18 | 1.02e+16 | 2.79e+13 | 8.22e+10 | 2.79e+08 | 1.36e+06 | 3.02e+04 | 3.29e+03 | 1.53e+03 | 9.01e+02 |
| | FGSM | 5.24e+15 | 9.63e+13 | 1.84e+12 | 3.69e+10 | 7.62e+08 | 1.69e+07 | 4.35e+05 | 1.56e+04 | 1.19e+03 | 4.22e+02 | 3.76e+02 | 3.63e+02 |
| | PGD | 1.20e+13 | 4.77e+11 | 1.96e+10 | 8.28e+08 | 3.66e+07 | 1.75e+06 | 9.45e+04 | 6.42e+03 | 8.39e+02 | 3.99e+02 | 3.67e+02 | 3.57e+02 |
| | AAE-Cox | 1.53e+20 | 9.61e+17 | 6.16e+15 | 4.00e+13 | 2.65e+11 | 1.87e+09 | 1.33e+07 | 1.16e+05 | 1.81e+03 | 3.47e+02 | 3.33e+02 | 3.31e+02 |
| | SAWAR | 6.21e+02 | 5.06e+02 | 4.28e+02 | 3.91e+02 | 3.67e+02 | 3.55e+02 | 3.47e+02 | 3.41e+02 | 3.37e+02 | 3.35e+02 | 3.34e+02 | 3.33e+02 |
| retinopathy | DRAFT | 1.21e+04 | 6.19e+03 | 3.21e+03 | 1.68e+03 | 9.15e+02 | 5.24e+02 | 3.31e+02 | 2.39e+02 | 1.96e+02 | 1.76e+02 | 1.71e+02 | 1.69e+02 |
| | Noise | 1.65e+04 | 8.10e+03 | 4.01e+03 | 2.03e+03 | 1.05e+03 | 5.83e+02 | 3.54e+02 | 2.47e+02 | 1.99e+02 | 1.77e+02 | 1.72e+02 | 1.69e+02 |
| | FGSM | 7.62e+03 | 4.03e+03 | 2.15e+03 | 1.18e+03 | 6.72e+02 | 4.10e+02 | 2.80e+02 | 2.16e+02 | 1.86e+02 | 1.73e+02 | 1.70e+02 | 1.69e+02 |
| | PGD | 7.32e+03 | 3.87e+03 | 2.08e+03 | 1.14e+03 | 6.55e+02 | 4.03e+02 | 2.75e+02 | 2.14e+02 | 1.85e+02 | 1.73e+02 | 1.70e+02 | 1.69e+02 |
| | AAE-Cox | 1.32e+13 | 3.68e+11 | 1.03e+10 | 2.98e+08 | 8.67e+06 | 2.82e+05 | 1.17e+04 | 8.14e+02 | 1.98e+02 | 1.68e+02 | 1.67e+02 | 1.67e+02 |
| | SAWAR | 6.10e+02 | 4.69e+02 | 3.69e+02 | 3.00e+02 | 2.51e+02 | 2.18e+02 | 1.96e+02 | 1.82e+02 | 1.74e+02 | 1.69e+02 | 1.68e+02 | 1.68e+02 |
| stagec | DRAFT | 1.17e+04 | 5.05e+03 | 2.20e+03 | 9.79e+02 | 4.44e+02 | 2.10e+02 | 1.07e+02 | 6.47e+01 | 4.80e+01 | 4.24e+01 | 4.15e+01 | 4.13e+01 |
| | Noise | 6.21e+04 | 2.17e+04 | 7.71e+03 | 2.72e+03 | 1.01e+03 | 3.86e+02 | 1.63e+02 | 8.11e+01 | 5.29e+01 | 4.44e+01 | 4.31e+01 | 4.27e+01 |
| | FGSM | 1.02e+04 | 4.31e+03 | 1.80e+03 | 7.90e+02 | 3.54e+02 | 1.69e+02 | 9.18e+01 | 5.99e+01 | 4.77e+01 | 4.40e+01 | 4.35e+01 | 4.36e+01 |
| | PGD | 8.55e+03 | 3.69e+03 | 1.60e+03 | 7.18e+02 | 3.32e+02 | 1.62e+02 | 8.89e+01 | 5.88e+01 | 4.73e+01 | 4.38e+01 | 4.34e+01 | 4.35e+01 |
| | AAE-Cox | 1.32e+20 | 6.14e+17 | 2.58e+15 | 1.21e+13 | 5.37e+10 | 2.81e+08 | 1.53e+06 | 1.01e+04 | 1.53e+02 | 4.20e+01 | 4.10e+01 | 4.09e+01 |
| | SAWAR | 2.52e+02 | 1.75e+02 | 1.26e+02 | 9.40e+01 | 7.32e+01 | 5.96e+01 | 5.14e+01 | 4.61e+01 | 4.28e+01 | 4.09e+01 | 4.04e+01 | 4.01e+01 |
| zinc | DRAFT | 1.34e+06 | 3.43e+05 | 8.95e+04 | 2.36e+04 | 6.49e+03 | 1.84e+03 | 5.72e+02 | 2.12e+02 | 1.11e+02 | 8.33e+01 | 7.84e+01 | 7.64e+01 |
| | Noise | 1.01e+07 | 2.02e+06 | 4.01e+05 | 8.52e+04 | 1.86e+04 | 4.26e+03 | 1.05e+03 | 3.06e+02 | 1.28e+02 | 8.63e+01 | 8.05e+01 | 7.86e+01 |
| | FGSM | 3.49e+05 | 9.39e+04 | 2.69e+04 | 7.98e+03 | 2.42e+03 | 8.00e+02 | 3.01e+02 | 1.41e+02 | 9.24e+01 | 7.95e+01 | 7.82e+01 | 7.82e+01 |
| | PGD | 4.28e+05 | 1.09e+05 | 2.89e+04 | 7.84e+03 | 2.37e+03 | 7.72e+02 | 2.87e+02 | 1.36e+02 | 9.09e+01 | 7.94e+01 | 7.83e+01 | 7.85e+01 |
| | AAE-Cox | 1.15e+24 | 1.54e+21 | 4.97e+18 | 8.90e+15 | 1.88e+13 | 2.84e+10 | 5.64e+07 | 1.63e+05 | 7.39e+02 | 8.21e+01 | 7.79e+01 | 7.76e+01 |
| | SAWAR | 5.06e+02 | 3.35e+02 | 2.31e+02 | 1.67e+02 | 1.28e+02 | 1.04e+02 | 9.02e+01 | 8.23e+01 | 7.82e+01 | 7.68e+01 | 7.68e+01 | 7.72e+01 |

TABLE VIII: Negative Log Likelihood metric for *SurvSet* datasets (lower is better) for each adversarial training method against the worst-case adversarial attack.

We find that as the $\epsilon$-perturbation magnitude increases from 0 to 1 for the FGSM adversarial attack, the relative percentage change from DRAFT to the adversarial training methods becomes larger and then smaller. The relative percent changes in Concordance Index metric from the DRAFT training objective to SAWAR training objective is shown in Table IX (where higher percentage change is better). We note that for very large $\epsilon$, since our data is standard normalized all methods begin to fail.

| $\epsilon$ | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| %$\Delta$ | 39.82 | 59.68 | 72.41 | 86.66 | 105.06 | 136.98 | 168.31 | 178.41 | 116.94 | 26.54 | 12.48 | 1.6 |

TABLE IX: The relative percent change in Concordance Index metric from the DRAFT model to the SAWAR training objective averaged across the *SurvSet* datasets for the FGSM adversarial attack. A lower relative percent change is better.

| Dataset | $\epsilon$ / Algorithm | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aids2 | DRAFT | 0.232 | 0.233 | 0.235 | 0.238 | 0.243 | 0.25 | 0.259 | 0.274 | 0.3 | 0.376 | 0.458 | 0.57 |
| | Noise | 0.23 | 0.231 | 0.233 | 0.236 | 0.24 | 0.249 | 0.26 | 0.277 | 0.306 | 0.386 | 0.465 | 0.569 |
| | FGSM | 0.356 | 0.363 | 0.375 | 0.389 | 0.403 | 0.421 | 0.439 | 0.459 | 0.477 | 0.508 | 0.531 | 0.566 |
| | PGD | 0.326 | 0.336 | 0.35 | 0.367 | 0.385 | 0.409 | 0.434 | 0.46 | 0.486 | 0.515 | 0.534 | 0.567 |
| | AAE-Cox | 0.241 | 0.246 | 0.253 | 0.261 | 0.271 | 0.282 | 0.299 | 0.332 | 0.39 | 0.474 | 0.523 | 0.573 |
| | SAWAR | 0.259 | 0.265 | 0.276 | 0.289 | 0.306 | 0.327 | 0.352 | 0.385 | 0.43 | 0.493 | 0.53 | 0.569 |
| Framingham | DRAFT | 0.142 | 0.143 | 0.143 | 0.144 | 0.144 | 0.145 | 0.148 | 0.168 | 0.257 | 0.468 | 0.6 | 0.722 |
| | Noise | 0.143 | 0.144 | 0.144 | 0.145 | 0.145 | 0.146 | 0.15 | 0.173 | 0.265 | 0.473 | 0.601 | 0.719 |
| | FGSM | 0.149 | 0.152 | 0.156 | 0.164 | 0.18 | 0.208 | 0.257 | 0.332 | 0.437 | 0.57 | 0.643 | 0.715 |
| | PGD | 0.181 | 0.189 | 0.2 | 0.218 | 0.245 | 0.285 | 0.34 | 0.411 | 0.5 | 0.603 | 0.66 | 0.717 |
| | AAE-Cox | 0.148 | 0.152 | 0.162 | 0.181 | 0.216 | 0.269 | 0.34 | 0.427 | 0.53 | 0.636 | 0.687 | 0.733 |
| | SAWAR | 0.149 | 0.158 | 0.178 | 0.213 | 0.268 | 0.34 | 0.417 | 0.5 | 0.584 | 0.665 | 0.702 | 0.737 |
| LeukSurv | DRAFT | 0.378 | 0.38 | 0.381 | 0.383 | 0.387 | 0.394 | 0.407 | 0.432 | 0.475 | 0.544 | 0.587 | 0.633 |
| | Noise | 0.39 | 0.393 | 0.397 | 0.401 | 0.406 | 0.411 | 0.417 | 0.428 | 0.453 | 0.507 | 0.556 | 0.624 |
| | FGSM | 0.397 | 0.401 | 0.405 | 0.41 | 0.418 | 0.427 | 0.443 | 0.466 | 0.499 | 0.554 | 0.59 | 0.635 |
| | PGD | 0.399 | 0.402 | 0.407 | 0.411 | 0.419 | 0.431 | 0.447 | 0.473 | 0.508 | 0.562 | 0.597 | 0.638 |
| | AAE-Cox | 0.376 | 0.377 | 0.379 | 0.382 | 0.388 | 0.4 | 0.42 | 0.453 | 0.506 | 0.575 | 0.615 | 0.656 |
| | SAWAR | 0.392 | 0.399 | 0.409 | 0.423 | 0.442 | 0.465 | 0.494 | 0.529 | 0.574 | 0.623 | 0.649 | 0.673 |
| TRACE | DRAFT | 0.219 | 0.221 | 0.225 | 0.232 | 0.247 | 0.279 | 0.334 | 0.415 | 0.524 | 0.642 | 0.696 | 0.745 |
| | Noise | 0.234 | 0.236 | 0.24 | 0.246 | 0.259 | 0.286 | 0.336 | 0.414 | 0.52 | 0.639 | 0.695 | 0.745 |
| | FGSM | 0.29 | 0.311 | 0.336 | 0.369 | 0.408 | 0.454 | 0.507 | 0.565 | 0.625 | 0.685 | 0.715 | 0.744 |
| | PGD | 0.304 | 0.326 | 0.353 | 0.388 | 0.428 | 0.475 | 0.525 | 0.58 | 0.635 | 0.691 | 0.718 | 0.745 |
| | AAE-Cox | 0.251 | 0.273 | 0.302 | 0.339 | 0.384 | 0.438 | 0.498 | 0.563 | 0.63 | 0.692 | 0.721 | 0.747 |
| | SAWAR | 0.287 | 0.32 | 0.363 | 0.411 | 0.464 | 0.519 | 0.57 | 0.62 | 0.665 | 0.708 | 0.729 | 0.747 |
| dataDIVAT1 | DRAFT | 0.097 | 0.098 | 0.099 | 0.1 | 0.101 | 0.103 | 0.105 | 0.122 | 0.214 | 0.414 | 0.53 | 0.655 |
| | Noise | 0.094 | 0.094 | 0.095 | 0.096 | 0.097 | 0.099 | 0.101 | 0.111 | 0.178 | 0.366 | 0.494 | 0.635 |
| | FGSM | 0.114 | 0.116 | 0.12 | 0.126 | 0.138 | 0.161 | 0.203 | 0.27 | 0.362 | 0.482 | 0.559 | 0.646 |
| | PGD | 0.137 | 0.143 | 0.152 | 0.167 | 0.188 | 0.22 | 0.265 | 0.33 | 0.409 | 0.511 | 0.574 | 0.648 |
| | AAE-Cox | 0.111 | 0.114 | 0.122 | 0.139 | 0.167 | 0.209 | 0.268 | 0.347 | 0.443 | 0.551 | 0.607 | 0.663 |
| | SAWAR | 0.156 | 0.201 | 0.253 | 0.311 | 0.368 | 0.422 | 0.461 | 0.506 | 0.555 | 0.609 | 0.637 | 0.67 |
| flchain | DRAFT | 0.152 | 0.153 | 0.154 | 0.155 | 0.156 | 0.157 | 0.159 | 0.164 | 0.197 | 0.895 | 0.903 | 0.921 |
| | Noise | 0.166 | 0.167 | 0.169 | 0.171 | 0.175 | 0.182 | 0.213 | 0.333 | 0.809 | 0.9 | 0.904 | 0.918 |
| | FGSM | 0.507 | 0.628 | 0.727 | 0.8 | 0.854 | 0.883 | 0.898 | 0.902 | 0.906 | 0.911 | 0.915 | 0.922 |
| | PGD | 0.539 | 0.717 | 0.824 | 0.876 | 0.896 | 0.9 | 0.903 | 0.905 | 0.908 | 0.913 | 0.917 | 0.923 |
| | AAE-Cox | 0.172 | 0.188 | 0.218 | 0.275 | 0.372 | 0.508 | 0.665 | 0.81 | 0.899 | 0.918 | 0.922 | 0.926 |
| | SAWAR | 0.628 | 0.831 | 0.894 | 0.9 | 0.904 | 0.907 | 0.909 | 0.912 | 0.916 | 0.921 | 0.924 | 0.927 |
| prostate | DRAFT | 0.308 | 0.311 | 0.314 | 0.318 | 0.321 | 0.326 | 0.333 | 0.339 | 0.357 | 0.435 | 0.531 | 0.668 |
| | Noise | 0.305 | 0.305 | 0.306 | 0.307 | 0.309 | 0.314 | 0.32 | 0.328 | 0.344 | 0.394 | 0.457 | 0.562 |
| | FGSM | 0.293 | 0.295 | 0.297 | 0.3 | 0.304 | 0.308 | 0.312 | 0.32 | 0.343 | 0.407 | 0.474 | 0.571 |
| | PGD | 0.299 | 0.301 | 0.303 | 0.305 | 0.308 | 0.312 | 0.318 | 0.331 | 0.36 | 0.431 | 0.502 | 0.588 |
| | AAE-Cox | 0.308 | 0.308 | 0.311 | 0.315 | 0.325 | 0.342 | 0.375 | 0.426 | 0.499 | 0.597 | 0.645 | 0.691 |
| | SAWAR | 0.288 | 0.292 | 0.299 | 0.31 | 0.326 | 0.349 | 0.384 | 0.432 | 0.499 | 0.579 | 0.618 | 0.657 |
| retinopathy | DRAFT | 0.139 | 0.141 | 0.145 | 0.15 | 0.152 | 0.152 | 0.153 | 0.158 | 0.209 | 0.425 | 0.554 | 0.669 |
| | Noise | 0.134 | 0.137 | 0.138 | 0.138 | 0.138 | 0.138 | 0.138 | 0.15 | 0.245 | 0.456 | 0.57 | 0.668 |
| | FGSM | 0.131 | 0.133 | 0.135 | 0.135 | 0.135 | 0.135 | 0.137 | 0.155 | 0.255 | 0.456 | 0.561 | 0.659 |
| | PGD | 0.13 | 0.13 | 0.131 | 0.131 | 0.131 | 0.131 | 0.134 | 0.154 | 0.254 | 0.456 | 0.56 | 0.657 |
| | AAE-Cox | 0.129 | 0.129 | 0.13 | 0.137 | 0.157 | 0.196 | 0.247 | 0.337 | 0.444 | 0.541 | 0.595 | 0.648 |
| | SAWAR | 0.131 | 0.13 | 0.13 | 0.131 | 0.135 | 0.149 | 0.178 | 0.251 | 0.371 | 0.51 | 0.584 | 0.647 |
| stagec | DRAFT | 0.137 | 0.136 | 0.136 | 0.132 | 0.136 | 0.135 | 0.151 | 0.174 | 0.23 | 0.34 | 0.407 | 0.512 |
| | Noise | 0.133 | 0.133 | 0.132 | 0.132 | 0.136 | 0.144 | 0.16 | 0.187 | 0.261 | 0.362 | 0.442 | 0.555 |
| | FGSM | 0.12 | 0.124 | 0.127 | 0.134 | 0.146 | 0.147 | 0.157 | 0.184 | 0.255 | 0.33 | 0.417 | 0.51 |
| | PGD | 0.115 | 0.117 | 0.122 | 0.128 | 0.141 | 0.144 | 0.154 | 0.181 | 0.259 | 0.327 | 0.412 | 0.505 |
| | AAE-Cox | 0.125 | 0.121 | 0.131 | 0.141 | 0.163 | 0.202 | 0.241 | 0.296 | 0.352 | 0.426 | 0.485 | 0.54 |
| | SAWAR | 0.123 | 0.124 | 0.127 | 0.139 | 0.149 | 0.179 | 0.239 | 0.281 | 0.347 | 0.425 | 0.486 | 0.558 |
| zinc | DRAFT | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.068 | 0.155 | 0.485 | 0.646 | 0.77 |
| | Noise | 0.053 | 0.053 | 0.054 | 0.053 | 0.054 | 0.057 | 0.062 | 0.095 | 0.248 | 0.547 | 0.668 | 0.776 |
| | FGSM | 0.055 | 0.056 | 0.056 | 0.058 | 0.06 | 0.07 | 0.095 | 0.199 | 0.404 | 0.61 | 0.705 | 0.783 |
| | PGD | 0.056 | 0.056 | 0.057 | 0.058 | 0.064 | 0.078 | 0.113 | 0.22 | 0.42 | 0.615 | 0.706 | 0.781 |
| | AAE-Cox | 0.062 | 0.065 | 0.079 | 0.101 | 0.162 | 0.227 | 0.291 | 0.409 | 0.551 | 0.655 | 0.708 | 0.759 |
| | SAWAR | 0.055 | 0.056 | 0.058 | 0.073 | 0.111 | 0.213 | 0.325 | 0.446 | 0.556 | 0.679 | 0.729 | 0.774 |

TABLE X: Concordance Index metric for *SurvSet* datasets (higher is better) for each adversarial training method against the FGSM adversarial attack.

We find that as the $\epsilon$-perturbation magnitude increases from 0 to 1 for the FGSM adversarial attack, the relative percentage change from DRAFT to the adversarial training methods becomes larger and then smaller. The relative percent changes in Integrated Brier Scores metric from the DRAFT training objective to SAWAR training objective is shown in Table XI (where lower percentage change is better). We note that for very large $\epsilon$, since our data is standard normalized all methods begin to fail.

| $\epsilon$ | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| %$\Delta$ | -44.57 | -46.37 | -47.93 | -49.06 | -49.43 | -48.69 | -46.35 | -41.82 | -33.56 | -20.63 | -11.37 | -0.65 |

TABLE XI: The relative percent change in Integrated Brier Score metric from the DRAFT model to the SAWAR training objective averaged across the *SurvSet* datasets for the FGSM adversarial attack. A lower relative percent change is better.

| Dataset | $\epsilon$ / Algorithm | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aids2 | DRAFT | 0.232 | 0.233 | 0.235 | 0.238 | 0.243 | 0.25 | 0.259 | 0.274 | 0.3 | 0.376 | 0.458 | 0.57 |
| | Noise | 0.23 | 0.231 | 0.233 | 0.236 | 0.24 | 0.249 | 0.26 | 0.277 | 0.306 | 0.386 | 0.465 | 0.569 |
| | FGSM | 0.356 | 0.363 | 0.375 | 0.389 | 0.403 | 0.421 | 0.439 | 0.459 | 0.477 | 0.508 | 0.531 | 0.566 |
| | PGD | 0.326 | 0.336 | 0.35 | 0.367 | 0.385 | 0.409 | 0.434 | 0.46 | 0.486 | 0.515 | 0.534 | 0.567 |
| | AAE-Cox | 0.241 | 0.246 | 0.253 | 0.261 | 0.271 | 0.282 | 0.299 | 0.332 | 0.39 | 0.474 | 0.523 | 0.573 |
| | SAWAR | 0.259 | 0.265 | 0.276 | 0.289 | 0.306 | 0.327 | 0.352 | 0.385 | 0.43 | 0.493 | 0.53 | 0.569 |
| Framingham | DRAFT | 0.142 | 0.143 | 0.143 | 0.144 | 0.144 | 0.145 | 0.148 | 0.168 | 0.257 | 0.468 | 0.6 | 0.722 |
| | Noise | 0.143 | 0.144 | 0.144 | 0.145 | 0.145 | 0.146 | 0.15 | 0.173 | 0.265 | 0.473 | 0.601 | 0.719 |
| | FGSM | 0.149 | 0.152 | 0.156 | 0.164 | 0.18 | 0.208 | 0.257 | 0.332 | 0.437 | 0.57 | 0.643 | 0.715 |
| | PGD | 0.181 | 0.189 | 0.2 | 0.218 | 0.245 | 0.285 | 0.34 | 0.411 | 0.5 | 0.603 | 0.66 | 0.717 |
| | AAE-Cox | 0.148 | 0.152 | 0.162 | 0.181 | 0.216 | 0.269 | 0.34 | 0.427 | 0.53 | 0.636 | 0.687 | 0.733 |
| | SAWAR | 0.149 | 0.158 | 0.178 | 0.213 | 0.268 | 0.34 | 0.417 | 0.5 | 0.584 | 0.665 | 0.702 | 0.737 |
| LeukSurv | DRAFT | 0.378 | 0.38 | 0.381 | 0.383 | 0.387 | 0.394 | 0.407 | 0.432 | 0.475 | 0.544 | 0.587 | 0.633 |
| | Noise | 0.39 | 0.393 | 0.397 | 0.401 | 0.406 | 0.411 | 0.417 | 0.428 | 0.453 | 0.507 | 0.556 | 0.624 |
| | FGSM | 0.397 | 0.401 | 0.405 | 0.41 | 0.418 | 0.427 | 0.443 | 0.466 | 0.499 | 0.554 | 0.59 | 0.635 |
| | PGD | 0.399 | 0.402 | 0.407 | 0.411 | 0.419 | 0.431 | 0.447 | 0.473 | 0.508 | 0.562 | 0.597 | 0.638 |
| | AAE-Cox | 0.376 | 0.377 | 0.379 | 0.382 | 0.388 | 0.4 | 0.42 | 0.453 | 0.506 | 0.575 | 0.615 | 0.656 |
| | SAWAR | 0.392 | 0.399 | 0.409 | 0.423 | 0.442 | 0.465 | 0.494 | 0.529 | 0.574 | 0.623 | 0.649 | 0.673 |
| TRACE | DRAFT | 0.219 | 0.221 | 0.225 | 0.232 | 0.247 | 0.279 | 0.334 | 0.415 | 0.524 | 0.642 | 0.696 | 0.745 |
| | Noise | 0.234 | 0.236 | 0.24 | 0.246 | 0.259 | 0.286 | 0.336 | 0.414 | 0.52 | 0.639 | 0.695 | 0.745 |
| | FGSM | 0.29 | 0.311 | 0.336 | 0.369 | 0.408 | 0.454 | 0.507 | 0.565 | 0.625 | 0.685 | 0.715 | 0.744 |
| | PGD | 0.304 | 0.326 | 0.353 | 0.388 | 0.428 | 0.475 | 0.525 | 0.58 | 0.635 | 0.691 | 0.718 | 0.745 |
| | AAE-Cox | 0.251 | 0.273 | 0.302 | 0.339 | 0.384 | 0.438 | 0.498 | 0.563 | 0.63 | 0.692 | 0.721 | 0.747 |
| | SAWAR | 0.287 | 0.32 | 0.363 | 0.411 | 0.464 | 0.519 | 0.57 | 0.62 | 0.665 | 0.708 | 0.729 | 0.747 |
| dataDIVAT1 | DRAFT | 0.097 | 0.098 | 0.099 | 0.1 | 0.101 | 0.103 | 0.105 | 0.122 | 0.214 | 0.414 | 0.53 | 0.655 |
| | Noise | 0.094 | 0.094 | 0.095 | 0.096 | 0.097 | 0.099 | 0.101 | 0.111 | 0.178 | 0.366 | 0.494 | 0.635 |
| | FGSM | 0.114 | 0.116 | 0.12 | 0.126 | 0.138 | 0.161 | 0.203 | 0.27 | 0.362 | 0.482 | 0.559 | 0.646 |
| | PGD | 0.137 | 0.143 | 0.152 | 0.167 | 0.188 | 0.22 | 0.265 | 0.33 | 0.409 | 0.511 | 0.574 | 0.648 |
| | AAE-Cox | 0.111 | 0.114 | 0.122 | 0.139 | 0.167 | 0.209 | 0.268 | 0.347 | 0.443 | 0.551 | 0.607 | 0.663 |
| | SAWAR | 0.156 | 0.201 | 0.253 | 0.311 | 0.368 | 0.422 | 0.461 | 0.506 | 0.555 | 0.609 | 0.637 | 0.67 |
| flchain | DRAFT | 0.152 | 0.153 | 0.154 | 0.155 | 0.156 | 0.157 | 0.159 | 0.164 | 0.197 | 0.895 | 0.903 | 0.921 |
| | Noise | 0.166 | 0.167 | 0.169 | 0.171 | 0.175 | 0.182 | 0.213 | 0.333 | 0.809 | 0.9 | 0.904 | 0.918 |
| | FGSM | 0.507 | 0.628 | 0.727 | 0.8 | 0.854 | 0.883 | 0.898 | 0.902 | 0.906 | 0.911 | 0.915 | 0.922 |
| | PGD | 0.539 | 0.717 | 0.824 | 0.876 | 0.896 | 0.9 | 0.903 | 0.905 | 0.908 | 0.913 | 0.917 | 0.923 |
| | AAE-Cox | 0.172 | 0.188 | 0.218 | 0.275 | 0.372 | 0.508 | 0.665 | 0.81 | 0.899 | 0.918 | 0.922 | 0.926 |
| | SAWAR | 0.628 | 0.831 | 0.894 | 0.9 | 0.904 | 0.907 | 0.909 | 0.912 | 0.916 | 0.921 | 0.924 | 0.927 |
| prostate | DRAFT | 0.308 | 0.311 | 0.314 | 0.318 | 0.321 | 0.326 | 0.333 | 0.339 | 0.357 | 0.435 | 0.531 | 0.668 |
| | Noise | 0.305 | 0.305 | 0.306 | 0.307 | 0.309 | 0.314 | 0.32 | 0.328 | 0.344 | 0.394 | 0.457 | 0.562 |
| | FGSM | 0.293 | 0.295 | 0.297 | 0.3 | 0.304 | 0.308 | 0.312 | 0.32 | 0.343 | 0.407 | 0.474 | 0.571 |
| | PGD | 0.299 | 0.301 | 0.303 | 0.305 | 0.308 | 0.312 | 0.318 | 0.331 | 0.36 | 0.431 | 0.502 | 0.588 |
| | AAE-Cox | 0.308 | 0.308 | 0.311 | 0.315 | 0.325 | 0.342 | 0.375 | 0.426 | 0.499 | 0.597 | 0.645 | 0.691 |
| | SAWAR | 0.288 | 0.292 | 0.299 | 0.31 | 0.326 | 0.349 | 0.384 | 0.432 | 0.499 | 0.579 | 0.618 | 0.657 |
| retinopathy | DRAFT | 0.139 | 0.141 | 0.145 | 0.15 | 0.152 | 0.152 | 0.153 | 0.158 | 0.209 | 0.425 | 0.554 | 0.669 |
| | Noise | 0.134 | 0.137 | 0.138 | 0.138 | 0.138 | 0.138 | 0.138 | 0.15 | 0.245 | 0.456 | 0.57 | 0.668 |
| | FGSM | 0.131 | 0.133 | 0.135 | 0.135 | 0.135 | 0.135 | 0.137 | 0.155 | 0.255 | 0.456 | 0.561 | 0.659 |
| | PGD | 0.13 | 0.13 | 0.131 | 0.131 | 0.131 | 0.131 | 0.134 | 0.154 | 0.254 | 0.456 | 0.56 | 0.657 |
| | AAE-Cox | 0.129 | 0.129 | 0.13 | 0.137 | 0.157 | 0.196 | 0.247 | 0.337 | 0.444 | 0.541 | 0.595 | 0.648 |
| | SAWAR | 0.131 | 0.13 | 0.13 | 0.131 | 0.135 | 0.149 | 0.178 | 0.251 | 0.371 | 0.51 | 0.584 | 0.647 |
| stagec | DRAFT | 0.137 | 0.136 | 0.136 | 0.132 | 0.136 | 0.135 | 0.151 | 0.174 | 0.23 | 0.34 | 0.407 | 0.512 |
| | Noise | 0.133 | 0.133 | 0.132 | 0.132 | 0.136 | 0.144 | 0.16 | 0.187 | 0.261 | 0.362 | 0.442 | 0.555 |
| | FGSM | 0.12 | 0.124 | 0.127 | 0.134 | 0.146 | 0.147 | 0.157 | 0.184 | 0.255 | 0.33 | 0.417 | 0.51 |
| | PGD | 0.115 | 0.117 | 0.122 | 0.128 | 0.141 | 0.144 | 0.154 | 0.181 | 0.259 | 0.327 | 0.412 | 0.505 |
| | AAE-Cox | 0.125 | 0.121 | 0.131 | 0.141 | 0.163 | 0.202 | 0.241 | 0.296 | 0.352 | 0.426 | 0.485 | 0.54 |
| | SAWAR | 0.123 | 0.124 | 0.127 | 0.139 | 0.149 | 0.179 | 0.239 | 0.281 | 0.347 | 0.425 | 0.486 | 0.558 |
| zinc | DRAFT | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.068 | 0.155 | 0.485 | 0.646 | 0.77 |
| | Noise | 0.053 | 0.053 | 0.054 | 0.053 | 0.054 | 0.057 | 0.062 | 0.095 | 0.248 | 0.547 | 0.668 | 0.776 |
| | FGSM | 0.055 | 0.056 | 0.056 | 0.058 | 0.06 | 0.07 | 0.095 | 0.199 | 0.404 | 0.61 | 0.705 | 0.783 |
| | PGD | 0.056 | 0.056 | 0.057 | 0.058 | 0.064 | 0.078 | 0.113 | 0.22 | 0.42 | 0.615 | 0.706 | 0.781 |
| | AAE-Cox | 0.062 | 0.065 | 0.079 | 0.101 | 0.162 | 0.227 | 0.291 | 0.409 | 0.551 | 0.655 | 0.708 | 0.759 |
| | SAWAR | 0.055 | 0.056 | 0.058 | 0.073 | 0.111 | 0.213 | 0.325 | 0.446 | 0.556 | 0.679 | 0.729 | 0.774 |

TABLE XII: Concordance Index metric for *SurvSet* datasets (higher is better) for each adversarial training method against the FGSM adversarial attack.

| Dataset | $\epsilon$ / Algorithm | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.05 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aids2 | DRAFT | 1.04e+03 | 9.95e+02 | 9.48e+02 | 9.01e+02 | 8.54e+02 | 8.06e+02 | 7.56e+02 | 7.04e+02 | 6.49e+02 | 5.92e+02 | 5.66e+02 | 5.41e+02 |
| | Noise | 9.94e+02 | 9.53e+02 | 9.11e+02 | 8.69e+02 | 8.26e+02 | 7.82e+02 | 7.37e+02 | 6.89e+02 | 6.39e+02 | 5.88e+02 | 5.64e+02 | 5.41e+02 |
| | FGSM | 6.16e+02 | 6.10e+02 | 6.04e+02 | 5.97e+02 | 5.91e+02 | 5.84e+02 | 5.77e+02 | 5.70e+02 | 5.63e+02 | 5.54e+02 | 5.48e+02 | 5.41e+02 |
| | PGD | 6.20e+02 | 6.13e+02 | 6.05e+02 | 5.98e+02 | 5.91e+02 | 5.83e+02 | 5.76e+02 | 5.68e+02 | 5.60e+02 | 5.52e+02 | 5.47e+02 | 5.41e+02 |
| | AAE-Cox | 7.00e+02 | 6.83e+02 | 6.67e+02 | 6.51e+02 | 6.35e+02 | 6.19e+02 | 6.03e+02 | 5.87e+02 | 5.71e+02 | 5.55e+02 | 5.47e+02 | 5.39e+02 |
| | SAWAR | 5.84e+02 | 5.80e+02 | 5.76e+02 | 5.72e+02 | 5.68e+02 | 5.63e+02 | 5.59e+02 | 5.55e+02 | 5.50e+02 | 5.45e+02 | 5.43e+02 | 5.40e+02 |
| Framingham | DRAFT | 4.23e+03 | 4.10e+03 | 3.91e+03 | 3.65e+03 | 3.33e+03 | 2.97e+03 | 2.61e+03 | 2.26e+03 | 1.95e+03 | 1.68e+03 | 1.57e+03 | 1.48e+03 |
| | Noise | 4.00e+03 | 3.89e+03 | 3.73e+03 | 3.51e+03 | 3.23e+03 | 2.91e+03 | 2.57e+03 | 2.24e+03 | 1.94e+03 | 1.69e+03 | 1.58e+03 | 1.48e+03 |
| | FGSM | 2.11e+03 | 2.07e+03 | 2.03e+03 | 1.98e+03 | 1.93e+03 | 1.88e+03 | 1.82e+03 | 1.75e+03 | 1.67e+03 | 1.58e+03 | 1.53e+03 | 1.48e+03 |
| | PGD | 1.99e+03 | 1.95e+03 | 1.91e+03 | 1.87e+03 | 1.83e+03 | 1.79e+03 | 1.74e+03 | 1.68e+03 | 1.62e+03 | 1.56e+03 | 1.52e+03 | 1.48e+03 |
| | AAE-Cox | 2.38e+03 | 2.27e+03 | 2.16e+03 | 2.06e+03 | 1.96e+03 | 1.87e+03 | 1.78e+03 | 1.70e+03 | 1.62e+03 | 1.54e+03 | 1.51e+03 | 1.47e+03 |
| | SAWAR | 1.96e+03 | 1.90e+03 | 1.84e+03 | 1.79e+03 | 1.73e+03 | 1.68e+03 | 1.64e+03 | 1.59e+03 | 1.55e+03 | 1.51e+03 | 1.49e+03 | 1.48e+03 |
| LeukSurv | DRAFT | 2.66e+03 | 2.16e+03 | 1.77e+03 | 1.45e+03 | 1.19e+03 | 9.73e+02 | 7.93e+02 | 6.41e+02 | 5.10e+02 | 3.99e+02 | 3.50e+02 | 3.07e+02 |
| | Noise | 1.13e+06 | 5.84e+05 | 2.96e+05 | 1.52e+05 | 7.88e+04 | 4.05e+04 | 1.94e+04 | 9.21e+03 | 4.25e+03 | 1.89e+03 | 1.23e+03 | 7.75e+02 |
| | FGSM | 2.76e+03 | 2.33e+03 | 1.96e+03 | 1.65e+03 | 1.39e+03 | 1.16e+03 | 9.64e+02 | 7.82e+02 | 6.18e+02 | 4.64e+02 | 3.92e+02 | 3.25e+02 |
| | PGD | 1.79e+03 | 1.57e+03 | 1.38e+03 | 1.21e+03 | 1.05e+03 | 9.10e+02 | 7.76e+02 | 6.49e+02 | 5.30e+02 | 4.15e+02 | 3.60e+02 | 3.07e+02 |
| | AAE-Cox | 1.09e+03 | 9.83e+02 | 8.87e+02 | 7.97e+02 | 7.12e+02 | 6.32e+02 | 5.57e+02 | 4.84e+02 | 4.12e+02 | 3.43e+02 | 3.12e+02 | 2.84e+02 |
| | SAWAR | 5.40e+02 | 5.12e+02 | 4.85e+02 | 4.57e+02 | 4.29e+02 | 4.01e+02 | 3.73e+02 | 3.46e+02 | 3.20e+02 | 2.94e+02 | 2.82e+02 | 2.70e+02 |
| TRACE | DRAFT | 2.31e+03 | 2.09e+03 | 1.87e+03 | 1.64e+03 | 1.43e+03 | 1.22e+03 | 1.03e+03 | 8.69e+02 | 7.29e+02 | 6.14e+02 | 5.66e+02 | 5.24e+02 |
| | Noise | 4.55e+03 | 3.85e+03 | 3.20e+03 | 2.63e+03 | 2.14e+03 | 1.72e+03 | 1.36e+03 | 1.06e+03 | 8.29e+02 | 6.60e+02 | 5.93e+02 | 5.35e+02 |
| | FGSM | 1.23e+03 | 1.15e+03 | 1.07e+03 | 9.98e+02 | 9.26e+02 | 8.54e+02 | 7.82e+02 | 7.13e+02 | 6.47e+02 | 5.85e+02 | 5.56e+02 | 5.28e+02 |
| | PGD | 1.17e+03 | 1.10e+03 | 1.03e+03 | 9.59e+02 | 8.90e+02 | 8.21e+02 | 7.54e+02 | 6.93e+02 | 6.35e+02 | 5.80e+02 | 5.53e+02 | 5.27e+02 |
| | AAE-Cox | 1.07e+03 | 1.00e+03 | 9.38e+02 | 8.77e+02 | 8.19e+02 | 7.63e+02 | 7.09e+02 | 6.59e+02 | 6.11e+02 | 5.68e+02 | 5.48e+02 | 5.29e+02 |
| | SAWAR | 1.01e+03 | 9.32e+02 | 8.63e+02 | 8.01e+02 | 7.47e+02 | 6.99e+02 | 6.57e+02 | 6.19e+02 | 5.84e+02 | 5.53e+02 | 5.38e+02 | 5.24e+02 |
| dataDIVAT1 | DRAFT | 1.78e+03 | 1.72e+03 | 1.64e+03 | 1.55e+03 | 1.44e+03 | 1.32e+03 | 1.20e+03 | 1.07e+03 | 9.55e+02 | 8.46e+02 | 7.96e+02 | 7.50e+02 |
| | Noise | 2.02e+03 | 1.96e+03 | 1.88e+03 | 1.78e+03 | 1.65e+03 | 1.50e+03 | 1.35e+03 | 1.19e+03 | 1.03e+03 | 8.87e+02 | 8.20e+02 | 7.59e+02 |
| | FGSM | 1.09e+03 | 1.07e+03 | 1.05e+03 | 1.02e+03 | 1.00e+03 | 9.72e+02 | 9.40e+02 | 9.03e+02 | 8.59e+02 | 8.09e+02 | 7.81e+02 | 7.52e+02 |
| | PGD | 1.01e+03 | 9.95e+02 | 9.78e+02 | 9.60e+02 | 9.41e+02 | 9.19e+02 | 8.94e+02 | 8.65e+02 | 8.32e+02 | 7.95e+02 | 7.74e+02 | 7.51e+02 |
| | AAE-Cox | 1.25e+03 | 1.18e+03 | 1.12e+03 | 1.06e+03 | 1.01e+03 | 9.55e+02 | 9.09e+02 | 8.65e+02 | 8.23e+02 | 7.83e+02 | 7.64e+02 | 7.45e+02 |
| | SAWAR | 9.24e+02 | 9.01e+02 | 8.79e+02 | 8.59e+02 | 8.39e+02 | 8.20e+02 | 8.04e+02 | 7.89e+02 | 7.74e+02 | 7.60e+02 | 7.53e+02 | 7.46e+02 |
| flchain | DRAFT | 2.56e+04 | 2.36e+04 | 2.15e+04 | 1.95e+04 | 1.73e+04 | 1.47e+04 | 1.11e+04 | 6.38e+03 | 2.91e+03 | 1.59e+03 | 1.27e+03 | 1.10e+03 |
| | Noise | 1.62e+05 | 1.27e+05 | 8.24e+04 | 4.85e+04 | 2.97e+04 | 1.81e+04 | 9.84e+03 | 5.14e+03 | 2.95e+03 | 1.80e+03 | 1.45e+03 | 1.24e+03 |
| | FGSM | 2.49e+03 | 2.17e+03 | 1.87e+03 | 1.62e+03 | 1.44e+03 | 1.34e+03 | 1.28e+03 | 1.23e+03 | 1.19e+03 | 1.14e+03 | 1.12e+03 | 1.10e+03 |
| | PGD | 2.07e+03 | 1.76e+03 | 1.53e+03 | 1.37e+03 | 1.28e+03 | 1.22e+03 | 1.19e+03 | 1.16e+03 | 1.14e+03 | 1.11e+03 | 1.10e+03 | 1.09e+03 |
| | AAE-Cox | 2.98e+03 | 2.85e+03 | 2.73e+03 | 2.62e+03 | 2.50e+03 | 2.38e+03 | 2.23e+03 | 1.97e+03 | 1.47e+03 | 1.12e+03 | 1.09e+03 | 1.08e+03 |
| | SAWAR | 2.18e+03 | 1.83e+03 | 1.55e+03 | 1.33e+03 | 1.20e+03 | 1.14e+03 | 1.13e+03 | 1.11e+03 | 1.10e+03 | 1.09e+03 | 1.09e+03 | 1.09e+03 |
| prostate | DRAFT | 1.50e+03 | 1.44e+03 | 1.36e+03 | 1.24e+03 | 1.10e+03 | 9.38e+02 | 7.70e+02 | 6.16e+02 | 4.90e+02 | 3.97e+02 | 3.63e+02 | 3.37e+02 |
| | Noise | 1.88e+06 | 1.21e+06 | 6.72e+05 | 3.64e+05 | 1.97e+05 | 9.86e+04 | 4.32e+04 | 1.69e+04 | 6.34e+03 | 2.38e+03 | 1.46e+03 | 9.01e+02 |
| | FGSM | 8.51e+02 | 8.48e+02 | 8.41e+02 | 8.25e+02 | 7.97e+02 | 7.47e+02 | 6.78e+02 | 5.92e+02 | 5.05e+02 | 4.25e+02 | 3.92e+02 | 3.63e+02 |
| | PGD | 7.46e+02 | 7.32e+02 | 7.17e+02 | 6.97e+02 | 6.69e+02 | 6.30e+02 | 5.79e+02 | 5.22e+02 | 4.63e+02 | 4.05e+02 | 3.79e+02 | 3.57e+02 |
| | AAE-Cox | 4.64e+02 | 4.47e+02 | 4.31e+02 | 4.16e+02 | 4.02e+02 | 3.89e+02 | 3.77e+02 | 3.64e+02 | 3.52e+02 | 3.41e+02 | 3.36e+02 | 3.31e+02 |
| | SAWAR | 4.40e+02 | 4.28e+02 | 4.15e+02 | 4.04e+02 | 3.92e+02 | 3.81e+02 | 3.70e+02 | 3.60e+02 | 3.51e+02 | 3.42e+02 | 3.37e+02 | 3.33e+02 |
| retinopathy | DRAFT | 5.04e+02 | 4.93e+02 | 4.70e+02 | 4.35e+02 | 3.93e+02 | 3.48e+02 | 3.02e+02 | 2.59e+02 | 2.22e+02 | 1.92e+02 | 1.80e+02 | 1.69e+02 |
| | Noise | 5.47e+02 | 5.29e+02 | 4.96e+02 | 4.54e+02 | 4.04e+02 | 3.54e+02 | 3.05e+02 | 2.62e+02 | 2.24e+02 | 1.94e+02 | 1.81e+02 | 1.69e+02 |
| | FGSM | 4.16e+02 | 4.09e+02 | 3.93e+02 | 3.69e+02 | 3.39e+02 | 3.06e+02 | 2.73e+02 | 2.41e+02 | 2.13e+02 | 1.89e+02 | 1.79e+02 | 1.69e+02 |
| | PGD | 4.11e+02 | 4.03e+02 | 3.88e+02 | 3.65e+02 | 3.37e+02 | 3.05e+02 | 2.71e+02 | 2.40e+02 | 2.12e+02 | 1.89e+02 | 1.78e+02 | 1.69e+02 |
| | AAE-Cox | 2.27e+02 | 2.21e+02 | 2.14e+02 | 2.09e+02 | 2.03e+02 | 1.97e+02 | 1.91e+02 | 1.85e+02 | 1.79e+02 | 1.73e+02 | 1.70e+02 | 1.67e+02 |
| | SAWAR | 3.27e+02 | 3.14e+02 | 2.99e+02 | 2.82e+02 | 2.65e+02 | 2.47e+02 | 2.29e+02 | 2.12e+02 | 1.96e+02 | 1.81e+02 | 1.74e+02 | 1.68e+02 |
| stagec | DRAFT | 1.38e+02 | 1.32e+02 | 1.24e+02 | 1.15e+02 | 1.04e+02 | 9.29e+01 | 8.09e+01 | 6.91e+01 | 5.82e+01 | 4.90e+01 | 4.49e+01 | 4.13e+01 |
| | Noise | 1.52e+02 | 1.44e+02 | 1.35e+02 | 1.24e+02 | 1.12e+02 | 9.97e+01 | 8.67e+01 | 7.39e+01 | 6.18e+01 | 5.13e+01 | 4.68e+01 | 4.27e+01 |
| | FGSM | 1.04e+02 | 1.01e+02 | 9.63e+01 | 9.11e+01 | 8.52e+01 | 7.85e+01 | 7.12e+01 | 6.37e+01 | 5.64e+01 | 4.96e+01 | 4.65e+01 | 4.36e+01 |
| | PGD | 1.01e+02 | 9.73e+01 | 9.31e+01 | 8.82e+01 | 8.27e+01 | 7.65e+01 | 6.97e+01 | 6.27e+01 | 5.58e+01 | 4.93e+01 | 4.63e+01 | 4.35e+01 |
| | AAE-Cox | 8.00e+01 | 7.47e+01 | 6.99e+01 | 6.55e+01 | 6.15e+01 | 5.77e+01 | 5.42e+01 | 5.07e+01 | 4.74e+01 | 4.41e+01 | 4.25e+01 | 4.09e+01 |
| | SAWAR | 9.46e+01 | 8.98e+01 | 8.41e+01 | 7.80e+01 | 7.17e+01 | 6.57e+01 | 6.03e+01 | 5.48e+01 | 4.95e+01 | 4.45e+01 | 4.23e+01 | 4.01e+01 |
| zinc | DRAFT | 5.01e+02 | 4.94e+02 | 4.77e+02 | 4.45e+02 | 3.93e+02 | 3.19e+02 | 2.39e+02 | 1.73e+02 | 1.27e+02 | 9.62e+01 | 8.52e+01 | 7.64e+01 |
| | Noise | 5.54e+02 | 5.34e+02 | 5.00e+02 | 4.52e+02 | 3.87e+02 | 3.10e+02 | 2.35e+02 | 1.75e+02 | 1.32e+02 | 1.01e+02 | 8.85e+01 | 7.86e+01 |
| | FGSM | 2.89e+02 | 2.79e+02 | 2.63e+02 | 2.39e+02 | 2.10e+02 | 1.79e+02 | 1.52e+02 | 1.28e+02 | 1.09e+02 | 9.21e+01 | 8.48e+01 | 7.82e+01 |
| | PGD | 2.77e+02 | 2.67e+02 | 2.51e+02 | 2.29e+02 | 2.02e+02 | 1.74e+02 | 1.48e+02 | 1.26e+02 | 1.07e+02 | 9.18e+01 | 8.48e+01 | 7.85e+01 |
| | AAE-Cox | 1.66e+02 | 1.57e+02 | 1.48e+02 | 1.38e+02 | 1.27e+02 | 1.17e+02 | 1.08e+02 | 9.94e+01 | 9.16e+01 | 8.44e+01 | 8.10e+01 | 7.76e+01 |
| | SAWAR | 2.11e+02 | 1.92e+02 | 1.73e+02 | 1.57e+02 | 1.42e+02 | 1.28e+02 | 1.15e+02 | 1.04e+02 | 9.42e+01 | 8.52e+01 | 8.11e+01 | 7.72e+01 |

TABLE XIII: Negative Log Likelihood metric for *SurvSet* datasets (lower is better) for each adversarial training method against the FGSM adversarial attack.

Instead of relying on confidence intervals—which do not definitively determine whether one adversarial training method outperforms another—we conducted a Friedman hypothesis test. While it is common in the machine learning and AI research community to repeatedly perform pairwise hypothesis tests based on confidence intervals (e.g., repeatedly for each dataset comparing two adversarial methods performance), this approach has significant drawbacks. It increases the risk of a high false discovery rate, potentially leading to incorrect rejection of the null hypothesis, and often relies on the normality assumption, which may not hold in practice. Therefore, we conducted a Friedman hypothesis test at a significance level of 0.05 for each metric (CI, IBS, and negative log-likelihood), treating the adversarial training methods as the "treatments" and the combinations of datasets, perturbation strengths, and perturbation methods as the "blocks". This test was chosen because it is well-suited for repeated measurements and allowed us to assess whether our training method produces a more robust, better-fitted, and more calibrated model across various perturbations (perturbation method and perturbation strength). Since the Friedman test revealed statistically significant differences for each metric, we conducted a post-hoc Conover-Iman test (a rank-based approach) to analyze pairwise differences between groups. To control the false discovery rate, we applied the Benjamini-Hochberg procedure

for p-value adjustment. Our findings show that our method, SAWAR, is indeed statistical significant improvement in performance (see critical difference diagram in Fig. 4).

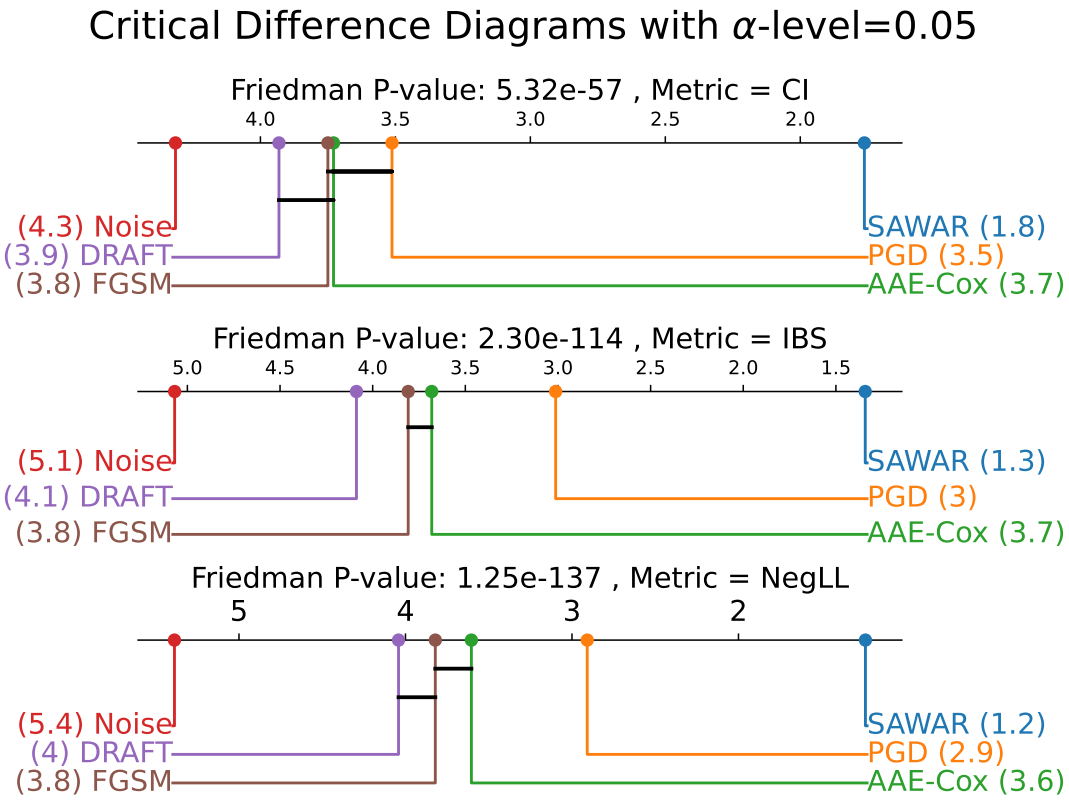


Fig. 4: Critical Difference Diagrams - The position of each adversarial training method is the mean rank across all blocks (datasets, perturbation method, and perturbation strength. Lower ranks (towards the right) indicate better performance on the respective metric. Black bars connecting different adversarial training methods indicate there is no statistically significant difference between the connected method, where the presence of the bars is determined by the post-hoc statistical Conover-Iman test with Benjamini-Hochberg adjustment.