

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations

| | | Imputation 1 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | >60/≤60 | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Female/Male | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•501 (0•849-2•652) | 0•1625 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | | |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | 1•933 (1•165-3•205) | 0•0107 |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•130 (1•212-3•744) | 0•0086 | | |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•144 (1•291-3•562) | 0•0032 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 2 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 3•766 (1•739-8•159) | 0•0008 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 4•670 (1•239-17•602) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 2•364 (1•073-5•209) | 0•0327 | 3•624 (1•491-8•810) | 0•0045 |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 10•744 (4•300-26•845) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•884 (1•139-3•117) | 0•0136 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | 1•759 (1•022-3•026) | 0•0414 |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | 1•639 (0•923-2•912) | 0•0920 |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•351 (1•309-4•223) | 0•0042 | 2•443 (1•185-5•038) | 0•0156 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 1•961 (1•165-3•299) | 0•0112 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 3 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•717 (1•320-5•593) | 0•0067 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | 2•054 (0•975-4•327) | 0•0583 |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | | |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 2•389 (1•167-4•890) | 0•0172 | 2•789 (1•355-5•740) | 0•0053 |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•178 (3•322-20•132) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•883 (1•142-3•104) | 0•0131 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | 1•611 (0•951-2•730) | 0•0760 |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | | |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•643 (1•439-4•854) | 0•0017 | 3•009 (1•584-5•718) | 0•0008 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•048 (1•231-3•406) | 0•0058 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 4 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•691 (0•864-3•311) | 0•1253 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•679 (1•035-2•725) | 0•0359 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | | |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•567 (1•369-4•814) | 0•0033 | 2•451 (1•294-4•641) | 0•0059 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 1•978 (1•188-3•293) | 0•0087 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 5 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•922 (0•886-4•167) | 0•0981 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | | |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | 1•933 (1•165-3•205) | 0•0107 |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•439 (1•316-4•520) | 0•0046 | | |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•144 (1•291-3•562) | 0•0032 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 6 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•234 (0•705-2•158) | 0•4619 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•674 (1•033-2•713) | 0•0365 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | | |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•227 (1•241-3•997) | 0•0073 | 2•328 (1•299-4•172) | 0•0045 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•203 (1•330-3•649) | 0•0022 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 7 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•581 (0•728-3•436) | 0•2471 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•700 (1•044-2•769) | 0•0329 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | | |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•217 (1•296-3•791) | 0•0036 | 2•312 (1•313-4•071) | 0•0037 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•089 (1•259-3•467) | 0•0044 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 8 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•988 (0•952-4•152) | 0•0673 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•646 (1•016-2•667) | 0•0430 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | | |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•414 (1•296-4•496) | 0•0055 | 2•471 (1•310-4•663) | 0•0052 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•142 (1•294-3•548) | 0•0031 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 9 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•366 (1•191-4•701) | 0•0140 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 5•805 (1•605-21•000) | 0•0073 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 1•646 (0•877-3•088) | 0•1207 | | |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 8•486 (3•550-20•284) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | | |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | 1•933 (1•165-3•205) | 0•0107 |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•150 (1•191-3•880) | 0•0111 | | |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•144 (1•291-3•562) | 0•0032 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Imputation 10 | | | |
|----------------------------------|-------------------------|-----------------------|---------|------------------------|---------|
| | | Univariable analysis | | Multivariable analysis | |
| | | Hazard ratio (95% CI) | P | Hazard ratio (95% CI) | P |
| Training set | | | | | |
| Age | >60/≤60 | 1•595 (0•821-3•098) | 0•1680 | 2•890 (1•402-5•959) | 0•0041 |
| Gender | Female/Male | 1•233 (0•561-2•707) | 0•6022 | | |
| Tobacco use | Y/N | 0•693 (0•357-1•346) | 0•2790 | | |
| Alcohol use | Y/N | 0•896 (0•464-1•732) | 0•7445 | | |
| Tumor location | Upper, middle/lower | 1•249 (0•602-2•591) | 0•5504 | | |
| Tumor grade | moderately, poorly/Well | 1•569 (0•685-3•592) | 0•2863 | | |
| T | T3, T4/T1, T2 | 0•767 (0•319-1•845) | 0•5540 | | |
| N | N1, N2, N3/N0 | 1•960 (0•974-3•943) | 0•0592 | | |
| TNM | III/I, II | 2•506 (1•202-5•226) | 0•0143 | | |
| Pneumonia | Y/N | 1•050 (0•144-7•672) | 0•9614 | | |
| Anastomotic leak | Y/N | 2•716 (0•829-8•892) | 0•0987 | 4•151 (1•102-15•637) | 0•0354 |
| Arrhythmia | Y/N | 1•416 (0•706-2•837) | 0•3271 | | |
| Adjuvant therapy | Y/N | 2•122 (1•005-4•480) | 0•0484 | 2•246 (0•997-5•060) | 0•0507 |
| lncRNA signature | High risk/low risk | 6•578 (2•837-15•252) | <0•0001 | 9•235 (3•791-22•492) | <0•0001 |
| Test + independent cohort | | | | | |
| Age | >60/≤60 | 1•724 (1•072-2•774) | 0•0246 | 1•726 (1•062-2•804) | 0•0276 |
| Gender | Female/Male | 1•283 (0•714-2•306) | 0•4045 | | |
| Tobacco use | Y/N | 0•788 (0•488-1•272) | 0•3295 | | |
| Alcohol use | Y/N | 0•866 (0•539-1•390) | 0•5501 | | |
| Tumor location | Upper, middle/lower | 1•184 (0•719-1•951) | 0•5065 | | |
| Tumor grade | moderately, poorly/Well | 0•982 (0•502-1•919) | 0•9571 | | |
| T | T3, T4/T1, T2 | 1•237 (0•716-2•183) | 0•4458 | | |
| N | N1, N2, N3/N0 | 2•214 (1•346-3•640) | 0•0017 | | |
| TNM | III/I, II | 2•031 (1•258-3•278) | 0•0037 | | |
| Pneumonia | Y/N | 1•507 (0•721-3•152) | 0•2759 | | |
| Anastomotic leak | Y/N | 0•942 (0•343-2•589) | 0•9085 | | |
| Arrhythmia | Y/N | 0•976 (0•558-1•705) | 0•9311 | | |
| Adjuvant therapy | Y/N | 2•584 (1•350-4•948) | 0•0042 | 2•694 (1•391-5•220) | 0•0033 |
| lncRNA signature | High risk/low risk | 2•412 (1•464-3•975) | 0•0005 | 2•096 (1•264-3•477) | 0•0041 |

Supplementary Table 3: Results of univariable and multivariable Cox regression analysis of the lncRNA signature and survival in the training set (n=60) and in the combined test and independent cohort (n=119) of ten imputations (Con't)

| | | Combining inference | |
|----------------------------------|-------------------------|---------------------------|-----------------------------|
| | | Univariable analysis P | Multivariable analysis P |
| Training set | | | |
| Age | >60/≤60 | 0•1680 | 0•0042 |
| Gender | Female/Male | 0•6022 | 0•2122 |
| Tobacco use | Y/N | 0•2790 | 0•6200 |
| Alcohol use | Y/N | 0•7445 | 0•1376 |
| Tumor location | Upper, middle/lower | 0•5504 | 0•5833 |
| Tumor grade | moderately, poorly/Well | 0•2863 | 0•3588 |
| T | T3, T4/T1, T2 | 0•5540 | 0•0031 |
| N | N1, N2, N3/N0 | 0•0592 | 0•0077 |
| TNM | III/I, II | 0•0143 | 0•0014 |
| Pneumonia | Y/N | 0•9614 | 0•7699 |
| Anastomotic leak | Y/N | 0•0987 | 0•3841 |
| Arrhythmia | Y/N | 0•3271 | 0•2905 |
| Adjuvant therapy | Y/N | 0•1694 | 0•3694 |
| lncRNA signature | High risk/low risk | <0•0001 | <0•0001 |
| Test + independent cohort | | | |
| Age | >60/≤60 | 0•0246 | 0•0150 |
| Gender | Female/Male | 0•4045 | 0•5880 |
| Tobacco use | Y/N | 0•3295 | 0•6391 |
| Alcohol use | Y/N | 0•5501 | 0•6099 |
| Tumor location | Upper, middle/lower | 0•5065 | 0•0575 |
| Tumor grade | moderately, poorly/Well | 0•9571 | 0•5293 |
| T | T3, T4/T1, T2 | 0•4458 | 0•9236 |
| N | N1, N2, N3/N0 | 0•0017 | 0•2243 |
| TNM | III/I, II | 0•0037 | 0•7298 |
| Pneumonia | Y/N | 0•2759 | 0•3370 |
| Anastomotic leak | Y/N | 0•9085 | 0•2321 |
| Arrhythmia | Y/N | 0•9311 | 0•4478 |
| Adjuvant therapy | Y/N | 0•0077 | 0•0406 |
| lncRNA signature | High risk/low risk | 0•0005 | 0•0185 |