Supplementary material

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *M-phantom* | *all nodules (N=30)* | *solid nodules (N=19)* | *PSN (N=3)* | *NSN (N=8)* | *PSN+NSN (N=11)* |
| *CT protocol* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* |
| *Standard CT* | *ref* | *ref* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* |
| *LDCT* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 1.2* | *96.7* | *96.6* | *100* | *100* | *100* | *100* | *87.5* | *85.7* | *90,9* | *90* |
| *ULDCT 1.3* | *96.7* | *93.1* | *100* | *100* | *66.7* | *100* | *100* | *75* | *90,9* | *80* |
| *ULDCT 1.4* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 1.5* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 2.2* | *86.7* | *88.5* | *100* | *94.7* | *100* | *100* | *50* | *50* | *63,6* | *71,4* |
| *ULDCT 2.3* | *90* | *88.9* | *100* | *94.7* | *100* | *100* | *62.5* | *60* | *72,7* | *75* |
| *ULDCT 2.4* | *100* | *90* | *100* | *100* | *100* | *100* | *100* | *62.5* | *100* | *72,7* |
| *ULDCT 2.5* | *100* | *96.7* | *100* | *100* | *100* | *100* | *100* | *87.5* | *100* | *90,9* |
| *ULDCT 3.2* | *86.7* | *80.8* | *100* | *84.2* | *100* | *100* | *50* | *50* | *63,6* | *71,4* |
| *ULDCT 3.3* | *86.7* | *76.9* | *100* | *84.2* | *100* | *66.7* | *50* | *50* | *63,6* | *57,1* |
| *ULDCT 3.4* | *96.7* | *75.9* | *100* | *84.2* | *100* | *100* | *87.5* | *42.9* | *90,9* | *60* |
| *ULDCT 3.5* | *96.7* | *89.7* | *100* | *84.2* | *100* | *100* | *87.5* | *100* | *90,9* | *100* |
| *ULDCT 4.2* | *80* | *70.8* | *94.7* | *88.9* | *100* | *33.3* | *37.5* | *0* | *54,5* | *16,7* |
| *ULDCT 4.3* | *76.7* | *73.9* | *89.5* | *88.2* | *100* | *33.3* | *37.5* | *33.3* | *54,5* | *33,3* |
| *ULDCT 4.4* | *90* | *70.4* | *94.7* | *83.3* | *100* | *33.3* | *75* | *50* | *81,8* | *44,4* |
| *ULDCT 4.5* | *90* | *74.1* | *89.5* | *88.2* | *100* | *66.7* | *87.5* | *42.9* | *90,9* | *50* |
| *ULDCT 5.2* | *83.3* | *76* | *94.7* | *88.9* | *100* | *66.7* | *50* | *25* | *63,6* | *42,9* |
| *ULDCT 5.3* | *83.3* | *84* | *94.7* | *88.9* | *100* | *100* | *50* | *50* | *63,6* | *71,4* |
| *ULDCT 5.4* | *90* | *81.5* | *94.7* | *88.9* | *100* | *100* | *75* | *50* | *81,8* | *66,7* |
| *ULDCT 5.5* | *83.3* | *92* | *84.2* | *93.8* | *100* | *100* | *75* | *83.3* | *81,8* | *88,9* |

*Supplementary table 1. Percentages of detectable (SENS; qualitative scores: 1, 2 and 3) and measurable (MEAS; qualitative scores: 2 and 3) nodules on M-phantom. ULDCT datasets are listed in the first column: the first number representing the scanning protocols and the second number the strength of the applied iterative reconstruction. Results are initially reported for the whole nodule dataset, then results are divided by nodule type, namely solid nodules, part-solid nodules, non-solid nodules and sub-solid nodules [PSN: part-solid nodules; NSN: non-solid nodules].*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *M-phantom* | *solid nodules ≥4 mm (N=15)* | *PSN ≥4 mm (N=3)* | *NSN ≥4 mm (N=8)* | *PSN+NSN ≥4 mm (N=11)* |
| *CT protocol* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* |
| *Standard CT* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* |
| *LDCT* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 1.2* | *100* | *100* | *100* | *100* | *87.5* | *85.7* | *90,9* | *90* |
| *ULDCT 1.3* | *100* | *100* | *66.7* | *100* | *100* | *75* | *90,9* | *80* |
| *ULDCT 1.4* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 1.5* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 2.2* | *100* | *100* | *100* | *100* | *50* | *50* | *63,6* | *71,4* |
| *ULDCT 2.3* | *100* | *100* | *100* | *100* | *62.5* | *60* | *72,7* | *75* |
| *ULDCT 2.4* | *100* | *100* | *100* | *100* | *100* | *62.5* | *100* | *72,7* |
| *ULDCT 2.5* | *100* | *100* | *100* | *100* | *100* | *87.5* | *100* | *90,9* |
| *ULDCT 3.2* | *100* | *100* | *100* | *100* | *50* | *50* | *63,6* | *71,4* |
| *ULDCT 3.3* | *100* | *100* | *100* | *66.7* | *50* | *50* | *63,6* | *57,1* |
| *ULDCT 3.4* | *100* | *100* | *100* | *100* | *87.5* | *42.9* | *90,9* | *60* |
| *ULDCT 3.5* | *100* | *100* | *100* | *100* | *87.5* | *100* | *90,9* | *100* |
| *ULDCT 4.2* | *100* | *100* | *100* | *33.3* | *37.5* | *100* | *54,5* | *16,7* |
| *ULDCT 4.3* | *100* | *100* | *100* | *33.3* | *37.5* | *33.3* | *54,5* | *33,3* |
| *ULDCT 4.4* | *100* | *100* | *100* | *100* | *75* | *50* | *81,8* | *44,4* |
| *ULDCT 4.5* | *100* | *100* | *100* | *66.7* | *87.5* | *42.9* | *90,9* | *50* |
| *ULDCT 5.2* | *100* | *100* | *100* | *66.7* | *50* | *25* | *63,6* | *42,9* |
| *ULDCT 5.3* | *100* | *100* | *100* | *100* | *50* | *50* | *63,6* | *71,4* |
| *ULDCT 5.4* | *100* | *100* | *100* | *100* | *75* | *50* | *81,8* | *66,7* |
| *ULDCT 5.5* | *100* | *100* | *100* | *100* | *75* | *83.3* | *81,8* | *88,9* |

*Supplementary table 2. Percentages of detectable (SENS; qualitative scores: 1, 2 and 3) and measurable (MEAS; qualitative scores: 2 and 3) nodules (≥4 mm) on M-phantom. ULDCT datasets are listed in the first column: the first number representing the scanning protocols and the second number the strength of the applied iterative reconstruction. Results are stratified by nodule type, namely solid nodules, part-solid nodules, non-solid nodules and sub-solid nodules [PSN: part-solid nodules; NSN: non-solid nodules].*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *M-phantom* | *solid nodules ≥6 mm (N=11)* | *PSN ≥6 mm (N=2)* | *NSN ≥6 mm (N=6)* | *PSN+NSN ≥6mm (N=11)* |
| *CT protocol* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* |
| *Standard CT* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* | *ref.* |
| *LDCT* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 1.2* | *100* | *100* | *100* | *100* | *100* | *83,3* | *100* | *87,5* |
| *ULDCT 1.3* | *100* | *100* | *50* | *100* | *100* | *83,3* | *87,5* | *85,7* |
| *ULDCT 1.4* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 1.5* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 2.2* | *100* | *100* | *100* | *100* | *66,7* | *50* | *75* | *66,7* |
| *ULDCT 2.3* | *100* | *100* | *100* | *100* | *83,3* | *60* | *87,5* | *71,4* |
| *ULDCT 2.4* | *100* | *100* | *100* | *100* | *100* | *66,7* | *100* | *75* |
| *ULDCT 2.5* | *100* | *100* | *100* | *100* | *100* | *83,3* | *100* | *87,5* |
| *ULDCT 3.2* | *100* | *100* | *100* | *100* | *66,7* | *50* | *75* | *66,7* |
| *ULDCT 3.3* | *100* | *100* | *100* | *50* | *66,7* | *50* | *75* | *50* |
| *ULDCT 3.4* | *100* | *100* | *100* | *100* | *100* | *50* | *100* | *62,5* |
| *ULDCT 3.5* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| *ULDCT 4.2* | *100* | *100* | *100* | *50* | *50* | *0* | *62,5* | *20* |
| *ULDCT 4.3* | *100* | *100* | *100* | *50* | *50* | *33,3* | *62,5* | *40* |
| *ULDCT 4.4* | *100* | *100* | *100* | *50* | *66,7* | *75* | *75* | *66,7* |
| *ULDCT 4.5* | *100* | *100* | *100* | *100* | *83,3* | *60* | *87,5* | *71,4* |
| *ULDCT 5.2* | *100* | *100* | *100* | *50* | *66,7* | *25* | *75* | *33,3* |
| *ULDCT 5.3* | *100* | *100* | *100* | *100* | *66,7* | *50* | *75* | *66,7* |
| *ULDCT 5.4* | *100* | *100* | *100* | *100* | *66,7* | *75* | *75* | *83,3* |
| *ULDCT 5.5* | *100* | *100* | *100* | *100* | *66,7* | *100* | *75* | *100* |

*Supplementary table 3. Percentages of detectable (SENS; qualitative scores: 1, 2 and 3) and measurable (MEAS; qualitative scores: 2 and 3) nodules (≥3 mm) on M-phantom. ULDCT datasets are listed in the first column: the first number representing the scanning protocols and the second number the strength of the applied iterative reconstruction. Results are stratified divided by nodule type, namely solid nodules, part-solid nodules, non-solid nodules and sub-solid nodules [PSN: part-solid nodules; NSN: non-solid nodules].*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L-phantom | all nodules (N=30) | solid nodules (N=19) | PSN (N=3) | NSN (N=8) | PSN+NSN (N=11) |
| CT protocol | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* |
| Standard CT | ref. | ref. | ref. | ref. | ref. | ref. | ref. | ref. | ref. | ref. |
| LDCT | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ULDCT 1.2 | 96,7 | 75,9 | 100 | 94,7 | 100 | 66,7 | 87,5 | 28,6 | 90,9 | 40 |
| ULDCT 1.3 | 96,7 | 89,7 | 100 | 100 | 100 | 100 | 87,5 | 57,1 | 90,9 | 70 |
| ULDCT 1.4 | 100 | 93,3 | 100 | 100 | 100 | 100 | 100 | 75 | 100 | 81,8 |
| ULDCT 1.5 | 100 | 96,7 | 100 | 100 | 100 | 100 | 100 | 87,5 | 100 | 90,9 |
| ULDCT 2.2 | 96,7 | 75,9 | 100 | 89,5 | 100 | 66,7 | 87,5 | 42,9 | 90,9 | 50 |
| ULDCT 2.3 | 100 | 80 | 100 | 89,5 | 100 | 66,7 | 100 | 62,5 | 100 | 63,6 |
| ULDCT 2.4 | 100 | 90 | 100 | 89,5 | 100 | 100 | 100 | 87,5 | 100 | 90,9 |
| ULDCT 2.5 | 100 | 93,3 | 100 | 89,5 | 100 | 100 | 100 | 100 | 100 | 100 |
| ULDCT 3.2 | 83,3 | 84 | 94,7 | 88,9 | 100 | 66,7 | 50 | 75 | 63,6 | 71,4 |
| ULDCT 3.3 | 93,3 | 75 | 94,7 | 88,9 | 100 | 66,7 | 87,5 | 42,9 | 90,9 | 50 |
| ULDCT 3.4 | 100 | 76,7 | 100 | 78,9 | 100 | 66,7 | 100 | 75 | 100 | 72,7 |
| ULDCT 3.5 | 96,7 | 72,4 | 94,7 | 83,3 | 100 | 66,7 | 100 | 50 | 100 | 54,5 |
| ULDCT 4.2 | 76,7 | 87 | 100 | 89,5 | 33,3 | 100 | 37,5 | 66,7 | 36,4 | 75 |
| ULDCT 4.3 | 83,3 | 80 | 100 | 84,2 | 100 | 33,3 | 37,5 | 100 | 54,5 | 66,7 |
| ULDCT 4.4 | 90 | 70,4 | 100 | 84,2 | 100 | 33,3 | 62,5 | 40 | 72,7 | 37,5 |
| ULDCT 4.5 | 86,7 | 73,1 | 94,7 | 83,3 | 100 | 33,3 | 62,5 | 60 | 72,7 | 50 |
| ULDCT 5.2 | 70 | 76,2 | 94,7 | 83,3 | 66,7 | 50 | 12,5 | 0 | 27,3 | 33,3 |
| ULDCT 5.3 | 76,7 | 69,6 | 94,7 | 83,3 | 66,7 | 50 | 37,5 | 100 | 45,5 | 20 |
| ULDCT 5.4 | 70 | 76,2 | 78,9 | 100 | 100 | 33,3 | 37,5 | 100 | 54,5 | 16,7 |
| ULDCT 5.5 | 70 | 81 | 78,9 | 100 | 100 | 33,3 | 37,5 | 33,3 | 54,5 | 33,3 |

*Supplementary table 4. Percentages of detectable (SENS; qualitative scores: 1, 2 and 3) and measurable (MEAS; qualitative scores: 2 and 3) nodules on L-phantom. ULDCT datasets are listed in the first column: the first number representing the scanning protocols and the second number the strength of the applied iterative reconstruction. Results are initially reported for the whole nodule dataset, then results are divided by nodule type, namely solid nodules, part-solid nodules, non-solid nodules and sub-solid nodules [PSN: part-solid nodules; NSN: non-solid nodules].*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| L-phantom | solid nodules ≥4 mm (N=15) | PSN ≥4 mm (N=3) | NSN ≥4 mm (N=8) | PSN+NSN ≥4 mm (N=11) |
| CT protocol | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* |
| Standard CT | ref. | ref. | ref. | ref. | ref. | ref. | ref. | ref. |
| LDCT | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ULDCT 1.2 | 100 | 100 | 100 | 66,7 | 87,5 | 28,6 | 90,9 | 40 |
| ULDCT 1.3 | 100 | 100 | 100 | 100 | 87,5 | 57,1 | 90,9 | 70 |
| ULDCT 1.4 | 100 | 100 | 100 | 100 | 100 | 75 | 100 | 81,8 |
| ULDCT 1.5 | 100 | 100 | 100 | 100 | 100 | 87,5 | 100 | 1000 |
| ULDCT 2.2 | 100 | 100 | 100 | 66,7 | 87,5 | 42,9 | 90,9 | 50 |
| ULDCT 2.3 | 100 | 100 | 100 | 66,7 | 100 | 62,5 | 100 | 63,6 |
| ULDCT 2.4 | 100 | 100 | 100 | 100 | 100 | 87,5 | 100 | 90,9 |
| ULDCT 2.5 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ULDCT 3.2 | 100 | 100 | 100 | 66,7 | 50 | 75 | 63,6 | 71,4 |
| ULDCT 3.3 | 100 | 100 | 100 | 66,7 | 87,5 | 42,9 | 90,9 | 50 |
| ULDCT 3.4 | 100 | 100 | 100 | 66,7 | 100 | 75 | 100 | 72,7 |
| ULDCT 3.5 | 100 | 100 | 100 | 66,7 | 100 | 50 | 100 | 54,5 |
| ULDCT 4.2 | 100 | 100 | 33,3 | 100 | 37,5 | 66,7 | 36,4 | 75 |
| ULDCT 4.3 | 100 | 100 | 100 | 33,3 | 37,5 | 100 | 54,5 | 66,7 |
| ULDCT 4.4 | 100 | 100 | 100 | 33,3 | 62,5 | 40 | 72,7 | 37,5 |
| ULDCT 4.5 | 100 | 100 | 100 | 33,3 | 62,5 | 60 | 72,7 | 50 |
| ULDCT 5.2 | 100 | 100 | 66,7 | 50 | 12,5 | 0 | 27,3 | 33,3 |
| ULDCT 5.3 | 100 | 100 | 66,7 | 50 | 37,5 | 0 | 45,5 | 20 |
| ULDCT 5.4 | 100 | 100 | 100 | 33,3 | 37,5 | 0 | 54,5 | 16,7 |
| ULDCT 5.5 | 100 | 100 | 100 | 33,3 | 37,5 | 33,3 | 54,5 | 33,3 |

*Supplementary table 5. Supplementary table 6. Percentages of detectable (SENS; qualitative scores: 1, 2 and 3) and measurable (MEAS; qualitative scores: 2 and 3) nodules (≥4 mm) on L-phantom. ULDCT datasets are listed in the first column: the first number representing the scanning protocols and the second number the strength of the applied iterative reconstruction. Results are stratified by nodule type, namely solid nodules, part-solid nodules, non-solid nodules and sub-solid nodules [PSN: part-solid nodules; NSN: non-solid nodules].*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| L-phantom | solid nodules ≥6 mm (N=11) | PSN ≥6 mm (N=2) | NSN ≥6 mm (N=6) | PSN+NSN ≥6mm (N=11) |
| CT protocol | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* | *SENS (%)* | *MEAS (%)* |
| Standard CT | ref. | ref. | ref. | ref. | ref. | ref. | ref. | ref. |
| LDCT | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ULDCT 1.2 | 100 | 100 | 100 | 50 | 83,3 | 40 | 87,5 | 42,9 |
| ULDCT 1.3 | 100 | 100 | 100 | 100 | 83,3 | 60 | 87,5 | 71,4 |
| ULDCT 1.4 | 100 | 100 | 100 | 100 | 100 | 66,7 | 100 | 75 |
| ULDCT 1.5 | 100 | 100 | 100 | 100 | 100 | 83,3 | 100 | 87,5 |
| ULDCT 2.2 | 100 | 100 | 100 | 50 | 83,3 | 60 | 87,5 | 57,1 |
| ULDCT 2.3 | 100 | 100 | 100 | 50 | 100 | 66,7 | 100 | 62,5 |
| ULDCT 2.4 | 100 | 100 | 100 | 100 | 100 | 83,3 | 100 | 87,5 |
| ULDCT 2.5 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ULDCT 3.2 | 100 | 100 | 100 | 50 | 66,7 | 75 | 75 | 66,7 |
| ULDCT 3.3 | 100 | 100 | 100 | 50 | 83,3 | 60 | 87,5 | 57,1 |
| ULDCT 3.4 | 100 | 100 | 100 | 50 | 100 | 66,7 | 100 | 62,5 |
| ULDCT 3.5 | 100 | 100 | 100 | 50 | 100 | 66,7 | 100 | 62,5 |
| ULDCT 4.2 | 100 | 100 | 50 | 100 | 50 | 66,7 | 50 | 75 |
| ULDCT 4.3 | 100 | 100 | 100 | 50 | 50 | 100 | 62,5 | 80 |
| ULDCT 4.4 | 100 | 100 | 100 | 50 | 66,7 | 50 | 75 | 50 |
| ULDCT 4.5 | 100 | 100 | 100 | 50 | 66,7 | 75 | 75 | 66,7 |
| ULDCT 5.2 | 100 | 100 | 100 | 50 | 16,7 | 0 | 37,5 | 33,3 |
| ULDCT 5.3 | 100 | 100 | 100 | 50 | 50 | 0 | 62,5 | 20 |
| ULDCT 5.4 | 100 | 100 | 100 | 50 | 50 | 0 | 62,5 | 20 |
| ULDCT 5.5 | 100 | 100 | 100 | 50 | 50 | 33,3 | 62,5 | 40 |

*Supplementary table 6. Percentages of detectable (SENS; qualitative scores: 1, 2 and 3) and measurable (MEAS; qualitative scores: 2 and 3) nodules (≥6 mm) on L-phantom. ULDCT datasets are listed in the first column: the first number representing the scanning protocols and the second number the strength of the applied iterative reconstruction. Results are stratified by nodule type, namely solid nodules, part-solid nodules, non-solid nodules and sub-solid nodules [PSN: part-solid nodules; NSN: non-solid nodules].*