**eFigure 1.** Flowchart showing derivation of our alternate standardized validation dataset



**eFigure 2.** ROC curves for the regression-based algorithms applied to the training and validation datasets

Algorithm sensitivities and specificities across various cut-points are illustrated on the above receiver operating characteristics (ROC) curves, with sensitivity along the y-axis, and 1-specificity along the x-axis. Sensitivities and specificities at a 0.5 cut-point are indicated by markers on each ROC curve. For example, the square markers (for the Crimmins algorithm) indicate just over 0.75 sensitivity and approximately 0.9 (= 1 – 0.1) specificity in the training data (black line), and approximately 0.4 sensitivity and 0.91 (= 1 – 0.9) specificity in the validation data (gray line). These ROC curves clearly demonstrate that across all algorithms, sensitivity is higher in the training data, while specificity is higher in the validation data at a 0.5 cut-point.

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| **eTable 1**. Performance metrics in the training and validation data within subgroups, after weighting to obtain estimates applicable to the U.S. age-eligible population |
| **Algorithm** | **Training data** | **Validation data** |
| **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** | **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** |
| ***By respondent status*** |
|  **Self** | **N/Nobs = 595** | **N = 351, Nobs = 485** |
|  H-W | 16 (9, 24) | 100 (100, 100) | 93 (91, 95) | 10 (2, 23) | 100 (100, 100) | 94 (92, 96) |
|  L-K-W | 33 (23, 44) | 97 (96, 98) | 92 (90, 94) | 19 (9, 34) | 98 (97, 99) | 93 (90, 95) |
|  Crimmins | 47 (35, 60) | 99 (98, 99) | 95 (93, 96) | 20 (9, 35) | 96 (92, 99) | 91 (87, 95) |
|  Hurd | 40 (29, 53) | 99 (98, 99) | 94 (93, 96) | 22 (11, 37) | 99 (98, 100) | 94 (92, 96) |
|  Wu | 39 (29, 52) | 99 (98, 99) | 94 (92, 96) | 21 (10, 36) | 99 (98, 99) | 94 (92, 96) |
|  **Proxy** | **N/Nobs = 165** | **N = 25, Nobs = 30** |
|  H-W | 75 (60, 86) | 86 (63, 99) | 79 (66, 89) | 22 (1, 62) | 92 (72, 100) | 56 (32, 80) |
|  L-K-W | 86 (71, 96) | 82 (64, 94) | 84 (73, 93) | 42 (12, 94) | 89 (68, 99) | 65 (40, 91) |
|  Crimmins | 90 (75, 99) | 58 (31, 78) | 78 (66, 88) | 64 (25, 98) | 51 (14, 80) | 57 (33, 80) |
|  Hurd | 96 (90, 99) | 88 (71, 96) | 92 (86, 97) | 41 (11, 93) | 98 (92, 100) | 69 (44, 96) |
|  Wu | 93 (87, 98) | 61 (36, 84) | 81 (70, 91) | 87 (54, 99) | 66 (34, 93) | 77 (57, 92) |
| ***By race/ethnicity*** |
|  **NH White** | **N/Nobs = 526** | **N = 271, Nobs = 369** |
|  H-W | 38 (29, 48) | 100 (100, 100) | 93 (90, 95) | 12 (1, 28) | 100 (99, 100) | 94 (91, 96) |
|  L-K-W | 51 (41, 63) | 98 (97, 99) | 93 (90, 95) | 21 (9, 38) | 99 (98, 99) | 93 (90, 96) |
|  Crimmins | 63 (52, 75) | 97 (96, 98) | 93 (91, 95) | 31 (16, 50) | 95 (91, 98) | 91 (86, 94) |
|  Hurd | 60 (49, 71) | 99 (98, 99) | 94 (92, 96) | 28 (14, 45) | 99 (98, 100) | 94 (91, 96) |
|  Wu | 61 (50, 73) | 99 (98, 99) | 94 (92, 96) | 31 (16, 49) | 99 (98, 100) | 94 (91, 96) |
|  **NH Black** | **N/Nobs=140** | **N = 65, Nobs = 97** |
|  H-W | 49 (32, 67) | 98 (96, 99) | 88 (81, 93) | 16 (2, 45) | 100 (99, 100) | 93 (86, 98) |
|  L-K-W | 71 (54, 87) | 83 (74, 90) | 81 (72, 87) | 47 (16, 84) | 90 (81, 95) | 86 (77, 93) |
|  Crimmins | 78 (65, 90) | 92 (83, 97) | 89 (81, 94) | 16 (3, 42) | 96 (91, 99) | 89 (81, 95) |
|  Hurd | 88 (76, 96) | 96 (93, 98) | 94 (90, 97) | 15 (2, 40) | 99 (96, 100) | 92 (84, 97) |
|  Wu | 66 (49, 83) | 94 (89, 97) | 88 (81, 93) | 24 (6, 59) | 94 (88, 98) | 88 (80, 95) |
|  **Hispanic** | **N/Nobs=76** | **N = 31, Nobs = 35** |
|  H-W | 48 (22, 78) | 90 (72, 99) | 85 (68, 96) | 4 (0, 25) | 99 (98, 100) | 80 (55, 96) |
|  L-K-W | 70 (39, 100) | 93 (87, 97) | 91 (82, 96) | 18 (1, 71) | 92 (79, 98) | 77 (51, 93) |
|  Crimmins | 66 (35, 96) | 96 (92, 99) | 93 (86, 97) | 9 (0, 48) | 93 (79, 99) | 76 (50, 93) |
|  Hurd | 71 (39, 100) | 97 (94, 99) | 95 (87, 98) | 9 (0, 48) | 99 (98, 100) | 81 (56, 97) |
|  Wu | 75 (42, 100) | 78 (59, 93) | 78 (60, 92) | 71 (13, 95) | 98 (92, 100) | 92 (82, 98) |
| ***By gender*** |
|  **Male** | **N/Nobs = 308** | **N = 182, Nobs = 255** |
|  H-W | 30 (19, 44) | 99 (99, 100) | 92 (89, 95) | 3 (1, 8) | 99 (98, 100) | 93 (89, 96) |
|  L-K-W | 48 (34, 63) | 96 (93, 97) | 91 (87, 94) | 30 (12, 54) | 97 (95, 98) | 92 (88, 95) |
|  Crimmins | 58 (43, 74) | 96 (94, 98) | 92 (89, 95) | 28 (10, 52) | 97 (95, 99) | 92 (89, 96) |
|  Hurd | 54 (39, 70) | 98 (96, 99) | 93 (90, 96) | 32 (13, 56) | 99 (97, 100) | 94 (91, 97) |
|  Wu | 48 (34, 64) | 98 (97, 99) | 93 (90, 95) | 27 (10, 51) | 99 (97, 100) | 94 (90, 97) |
|  **Female** | **N/Nobs = 452** | **N = 194, Nobs = 270** |
|  H-W | 48 (36, 60) | 99 (97, 100) | 92 (89, 94) | 18 (3, 38) | 100 (100, 100) | 93 (90, 96) |
|  L-K-W | 61 (49, 73) | 97 (96, 98) | 92 (89, 94) | 20 (8, 39) | 98 (97, 99) | 92 (88, 95) |
|  Crimmins | 70 (58, 82) | 98 (96, 99) | 94 (91, 96) | 29 (13, 51) | 94 (88, 98) | 89 (83, 94) |
|  Hurd | 71 (59, 81) | 99 (98, 99) | 95 (93, 97) | 22 (10, 42) | 99 (98, 100) | 93 (89, 96) |
|  Wu | 71 (59, 83) | 97 (94, 98) | 93 (90, 96) | 38 (19, 62) | 98 (97, 99) | 93 (90, 96) |
| ***By age*** |
|  **< 80** | **N/Nobs = 364** | **N = 170, Nobs = 225** |
|  H-W | 49 (30, 68) | 99 (98, 100) | 96 (94, 98) | 11 (0, 37) | 100 (99, 100) | 94 (90, 97) |
|  L-K-W | 62 (42, 82) | 97 (96, 98) | 95 (93, 97) | 8 (1, 28) | 98 (97, 99) | 93 (88, 96) |
|  Crimmins | 57 (38, 77) | 99 (98, 99) | 96 (94, 98) | 20 (2, 50) | 98 (97, 100) | 94 (89, 97) |
|  Hurd | 51 (32, 70) | 100 (99, 100) | 97 (95, 98) | 7 (0, 25) | 100 (99, 100) | 94 (90, 97) |
|  Wu | 54 (35, 74) | 98 (96, 99) | 95 (93, 97) | 30 (2, 63) | 99 (98, 100) | 95 (91, 98) |
|  **80+** | **N/Nobs = 396** | **N = 206, Nobs = 290** |
|  H-W | 39 (30, 50) | 99 (99, 100) | 85 (80, 88) | 13 (4, 30) | 100 (99, 100) | 92 (89, 95) |
|  L-K-W | 54 (44, 65) | 95 (92, 97) | 85 (80, 89) | 34 (18, 53) | 97 (95, 98) | 92 (88, 95) |
|  Crimmins | 70 (59, 81) | 93 (90, 96) | 87 (83, 91) | 35 (19, 53) | 93 (85, 97) | 87 (80, 93) |
|  Hurd | 72 (62, 81) | 96 (93, 98) | 90 (86, 93) | 38 (22, 57) | 98 (96, 99) | 93 (89, 95) |
|  Wu | 68 (57, 79) | 96 (94, 97) | 89 (85, 92) | 37 (21, 56) | 98 (96, 99) | 92 (89, 95) |
| ***By education*** |
|  **< High school** | **N/Nobs = 369** | **N = 157, Nobs = 215** |
|  H-W | 39 (28, 51) | 97 (94, 99) | 87 (82, 91) | 7 (2, 16) | 99 (97, 100) | 87 (80, 92) |
|  L-K-W | 61 (48, 75) | 92 (89, 94) | 86 (82, 90) | 29 (14, 51) | 93 (89, 96) | 85 (77, 91) |
|  Crimmins | 64 (50, 78) | 93 (89, 96) | 88 (83, 92) | 22 (10, 41) | 88 (74, 96) | 79 (67, 88) |
|  Hurd | 66 (53, 78) | 97 (95, 98) | 91 (88, 94) | 24 (11, 44) | 98 (96, 100) | 89 (82, 94) |
|  Wu | 72 (60, 84) | 92 (87, 96) | 88 (84, 92) | 36 (16, 59) | 95 (91, 98) | 88 (81, 93) |
|  **High school +** | **N/Nobs = 391** | **N = 219, Nobs = 300** |
|  H-W | 45 (32, 59) | 100 (100, 100) | 94 (92, 96) | 18 (1, 41) | 100 (100, 100) | 96 (93, 98) |
|  L-K-W | 53 (40, 67) | 99 (97, 99) | 94 (91, 96) | 19 (5, 41) | 99 (98, 100) | 95 (92, 97) |
|  Crimmins | 69 (55, 81) | 99 (98, 99) | 96 (94, 97) | 35 (14, 59) | 98 (96, 99) | 95 (92, 97) |
|  Hurd | 65 (51, 78) | 99 (98, 100) | 96 (93, 97) | 27 (10, 50) | 99 (98, 100) | 95 (92, 97) |
|  Wu | 57 (43, 71) | 99 (99, 100) | 95 (93, 97) | 33 (13, 58) | 100 (99, 100) | 96 (93, 98) |
| Abbreviations: H-W = Herzog-Wallace; L-K-W = Langa-Kabeto-Weir |

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| **eTable 2**. Performance metrics of re-estimated regression-based algorithms in the training and validation data, overall and within subgroups |
| **Algorithm** | **Training data** | **Validation data** |
| **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** | **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** |
| ***Overall*** | **N/Nobs = 760** | **N = 376, Nobs=515** |
|  Crimmins | 79 (74, 83) | 92 (90, 94) | 88 (85, 90) | 42 (31, 54) | 97 (95, 98) | 89 (86, 92) |
|  Hurd | 76 (70, 81) | 91 (89, 94) | 86 (83, 88) | 34 (23, 45) | 96 (94, 98) | 88 (85, 90) |
|  Wu | 76 (70, 81) | 91 (89, 94) | 86 (83, 88) | 36 (25, 48) | 95 (92, 97) | 87 (84, 90) |
| ***By respondent status*** |
|  **Self** | **N/Nobs = 595** | **N = 351, Nobs = 485** |
|  Crimmins | 61 (52, 69) | 94 (92, 96) | 87 (84, 90) | 36 (23, 48) | 97 (96, 99) | 90 (88, 93) |
|  Hurd | 54 (45, 63) | 93 (90, 95) | 84 (81, 87) | 28 (17, 41) | 97 (96, 99) | 89 (86, 92) |
|  Wu | 56 (48, 65) | 94 (91, 96) | 86 (83, 88) | 28 (17, 41) | 96 (94, 98) | 88 (85, 91) |
|  **Proxy** | **N/Nobs = 165** | **N = 25, Nobs = 30** |
|  Crimmins | 96 (91, 99) | 61 (43, 77) | 89 (83, 93) | 67 (40, 91) | 75 (46, 100) | 70 (52, 87) |
|  Hurd | 96 (93, 99) | 73 (57, 88) | 92 (87, 96) | 54 (27, 80) | 67 (43, 90) | 60 (43, 77) |
|  Wu | 94 (90, 98) | 58 (40, 74) | 87 (81, 92) | 67 (41, 90) | 67 (40, 93) | 67 (49, 84) |
| ***By race/ethnicity*** |
|  **NH White** | **N/Nobs = 526** | **N = 271, Nobs = 369** |
|  Crimmins | 78 (71, 84) | 94 (91, 96) | 89 (86, 91) | 43 (29, 58) | 98 (95, 99) | 91 (88, 94) |
|  Hurd | 73 (66, 79) | 94 (91, 96) | 87 (84, 90) | 41 (26, 56) | 98 (96, 99) | 91 (88, 94) |
|  Wu | 74 (67, 80) | 95 (93, 97) | 88 (85, 91) | 38 (24, 53) | 97 (94, 99) | 90 (86, 93) |
|  **NH Black** | **N/Nobs=140** | **N = 65, Nobs = 97** |
|  Crimmins | 83 (73, 92) | 88 (80, 94) | 86 (80, 91) | 40 (14, 67) | 97 (92, 100) | 88 (81, 94) |
|  Hurd | 83 (72, 92) | 82 (73, 90) | 82 (75, 88) | 13 (0, 33) | 93 (86, 98) | 81 (71, 88) |
|  Wu | 74 (63, 85) | 82 (73, 90) | 79 (72, 85) | 33 (9, 60) | 91 (82, 97) | 82 (73, 89) |
|  **Hispanic** | **N/Nobs=76** | **N = 31, Nobs = 35** |
|  Crimmins | 80 (60, 95) | 88 (78, 95) | 86 (77, 93) | 29 (0, 63) | 93 (79, 100) | 74 (58, 88) |
|  Hurd | 86 (67, 100) | 88 (78, 95) | 87 (79, 94) | 29 (0, 63) | 93 (79, 100) | 74 (58, 88) |
|  Wu | 90 (74, 100) | 80 (69, 90) | 83 (74, 91) | 29 (0, 63) | 96 (86, 100) | 77 (61, 91) |

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| ***By gender*** |
|  **Male** | **N/Nobs = 308** | **N = 182, Nobs = 255** |
|  Crimmins | 71 (60, 80) | 90 (86, 94) | 85 (80, 89) | 47 (29, 65) | 96 (93, 99) | 90 (86, 94) |
|  Hurd | 68 (57, 78) | 90 (86, 94) | 84 (80, 88) | 33 (17, 51) | 96 (93, 98) | 88 (84, 92) |
|  Wu | 63 (52, 73) | 94 (91, 97) | 86 (82, 90) | 30 (14, 48) | 95 (92, 98) | 87 (83, 91) |
|  **Female** | **N/Nobs = 452** | **N = 194, Nobs = 270** |
|  Crimmins | 82 (77, 88) | 94 (91, 96) | 89 (86, 92) | 39 (24, 54) | 97 (95, 99) | 88 (84, 92) |
|  Hurd | 79 (73, 85) | 92 (89, 95) | 87 (84, 90) | 34 (20, 50) | 97 (94, 99) | 87 (83, 91) |
|  Wu | 81 (76, 87) | 89 (85, 93) | 86 (83, 89) | 41 (26, 57) | 94 (91, 97) | 86 (82, 90) |
| ***By age*** |
|  **< 80** | **N/Nobs = 364** | **N = 170, Nobs = 225** |
|  Crimmins | 65 (53, 76) | 97 (94, 99) | 91 (88, 94) | 29 (8, 54) | 99 (98, 100) | 94 (91, 97) |
|  Hurd | 62 (50, 73) | 97 (94, 99) | 90 (87, 93) | 17 (0, 38) | 100 (100, 100) | 94 (91, 97) |
|  Wu | 60 (48, 72) | 97 (95, 99) | 90 (87, 93) | 17 (0, 38) | 98 (96, 100) | 92 (88, 95) |
|  **80+** | **N/Nobs = 396** | **N = 206, Nobs = 290** |
|  Crimmins | 84 (78, 89) | 86 (80, 90) | 85 (81, 88) | 46 (33, 60) | 95 (91, 97) | 86 (81, 90) |
|  Hurd | 81 (75, 86) | 84 (78, 88) | 82 (78, 86) | 39 (26, 52) | 93 (89, 96) | 83 (78, 87) |
|  Wu | 81 (75, 86) | 83 (78, 88) | 82 (78, 86) | 42 (29, 56) | 92 (88, 95) | 83 (78, 87) |
| ***By education*** |
|  **< High school** | **N/Nobs = 369** | **N = 157, Nobs = 215** |
|  Crimmins | 75 (68, 82) | 89 (84, 92) | 83 (79, 87) | 42 (27, 57) | 95 (92, 98) | 85 (79, 89) |
|  Hurd | 74 (67, 81) | 86 (81, 90) | 81 (77, 85) | 30 (17, 45) | 94 (90, 97) | 81 (76, 87) |
|  Wu | 79 (72, 85) | 83 (78, 88) | 81 (77, 85) | 37 (23, 52) | 90 (85, 95) | 80 (74, 85) |
|  **High school +** | **N/Nobs = 391** | **N = 219, Nobs = 300** |
|  Crimmins | 83 (76, 89) | 95 (92, 97) | 91 (88, 94) | 43 (24, 62) | 97 (95, 99) | 92 (89, 95) |
|  Hurd | 77 (69, 84) | 96 (93, 98) | 90 (87, 93) | 39 (21, 58) | 97 (95, 99) | 92 (89, 95) |
|  Wu | 72 (64, 80) | 98 (96, 100) | 90 (87, 93) | 35 (18, 54) | 98 (96, 99) | 92 (89, 95) |

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| **eTable 3**. Out-of-sample performance metrics in the training data using leave-one-out cross-validation (LOOCV), overall and by subgroups |
| **Algorithm** | **Sensitivity%** | **Specificity%** | **Accuracy %** |
| ***Overall (*N/Nobs = 760)** |
|  Crimmins | 76 | 91 | 86 |
|  Hurd | 72 | 90 | 84 |
|  Wu | 75 | 90 | 85 |
| ***By respondent status*** |
|  **Self (N/Nobs = 595)** |
|  Crimmins | 56 | 94 | 86 |
|  Hurd | 50 | 92 | 83 |
|  Wu | 55 | 93 | 85 |
|  **Proxy (N/Nobs = 165)** |
|  Crimmins | 94 | 55 | 86 |
|  Hurd | 92 | 61 | 86 |
|  Wu | 94 | 55 | 86 |
| ***By race/ethnicity*** |
|  **NH White (N/Nobs = 526)** |
|  Crimmins | 76 | 93 | 88 |
|  Hurd | 70 | 93 | 85 |
|  Wu | 73 | 95 | 87 |
|  **NH Black (N/Nobs=140)** |
|  Crimmins | 78 | 85 | 82 |
|  Hurd | 78 | 80 | 79 |
|  Wu | 74 | 82 | 79 |
|  **Hispanic (N/Nobs=76)** |
|  Crimmins | 70 | 88 | 83 |
|  Hurd | 75 | 86 | 83 |
|  Wu | 90 | 77 | 80 |
| ***By gender*** |
|  **Male (N/Nobs = 308)** |
|  Crimmins | 67 | 89 | 83 |
|  Hurd | 63 | 89 | 82 |
|  Wu | 62 | 93 | 85 |
|  **Female (N/Nobs = 452)** |
|  Crimmins | 80 | 93 | 88 |
|  Hurd | 76 | 91 | 85 |
|  Wu | 81 | 88 | 85 |
| ***By age*** |
|  **< 80 (N/Nobs = 364)** |
|  Crimmins | 63 | 96 | 90 |
|  Hurd | 60 | 95 | 89 |
|  Wu | 59 | 96 | 89 |
|  **80+ (N/Nobs = 396)** |
|  Crimmins | 80 | 84 | 82 |
|  Hurd | 76 | 83 | 79 |
|  Wu | 81 | 82 | 81 |
| ***By education*** |
|  **< High school (N/Nobs = 369)** |
|  Crimmins | 71 | 87 | 81 |
|  Hurd | 71 | 85 | 79 |
|  Wu | 77 | 82 | 80 |
|  **High school + (N/Nobs = 391)** |
|  Crimmins | 81 | 95 | 91 |
|  Hurd | 73 | 95 | 88 |
|  Wu | 72 | 98 | 90 |

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| **eTable 4**. Performance metrics in the alternate validation data, overall and within subgroups |
| **Algorithm** | **Alternate Validation Data** |
| **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** |
| ***Overall*** | **N=651, Nobs = 1,049** |
|  H-W | 57 (52, 63) | 98 (96, 99) | 75 (71, 78) |
|  L-K-W | 79 (75, 83) | 89 (85, 92) | 83 (80, 86) |
|  Crimmins | 82 (78, 85) | 91 (88, 94) | 86 (83, 88) |
|  Hurd | 82 (78, 86) | 96 (93, 98) | 88 (86, 90) |
|  Wu | 81 (76, 84) | 92 (89, 95) | 86 (83, 88) |
| ***By respondent status*** |
|  **Self** | **N =467, Nobs = 706** |
|  H-W | 41 (34, 49) | 98 (97, 99) | 77 (73, 81) |
|  L-K-W | 60 (53, 67) | 90 (86, 93) | 78 (75, 82) |
|  Crimmins | 64 (57, 71) | 93 (90, 96) | 82 (78, 85) |
|  Hurd | 68 (62, 75) | 96 (94, 98) | 86 (82, 89) |
|  Wu | 64 (57, 71) | 94 (91, 96) | 83 (79, 86) |
|  **Proxy** | **N = 184, Nobs = 343** |
|  H-W | 70 (64, 77) | 82 (53, 100) | 71 (64, 77) |
|  L-K-W | 94 (91, 97) | 67 (40, 93) | 93 (89, 96) |
|  Crimmins | 96 (93, 98) | 33 (10, 60) | 93 (90, 96) |
|  Hurd | 93 (90, 97) | 88 (69, 100) | 93 (90, 96) |
|  Wu | 94 (90, 97) | 53 (25, 82) | 92 (88, 95) |
| ***By race/ethnicity*** |
|  **NH White** | **N = 454, Nobs = 724** |
|  H-W | 57 (51, 64) | 99 (97, 100) | 76 (72, 80) |
|  L-K-W | 77 (71, 82) | 94 (90, 97) | 85 (81, 88) |
|  Crimmins | 83 (78, 87) | 93 (89, 96) | 88 (85, 90) |
|  Hurd | 84 (80, 88) | 97 (95, 98) | 90 (87, 92) |
|  Wu | 80 (75, 85) | 95 (92, 98) | 87 (84, 90) |
|  **NH Black** | **N/Nobs=140** **N = 125, Nobs = 211** |
|  H-W | 61 (50, 71) | 97 (92, 100) | 75 (67, 83) |
|  L-K-W | 87 (78, 93) | 76 (65, 85) | 82 (76, 88) |
|  Crimmins | 79 (70, 88) | 86 (77, 94) | 82 (75, 88) |
|  Hurd | 81 (72, 89) | 92 (84, 98) | 85 (79, 91) |
|  Wu | 82 (72, 90) | 84 (74, 93) | 83 (75, 89) |
|  **Hispanic** | **N = 55, Nobs = 85** |
|  H-W | 54 (37, 71) | 96 (87, 100) | 67 (54, 80) |
|  L-K-W | 75 (59, 88) | 77 (62, 92) | 76 (64, 86) |
|  Crimmins | 75 (59, 88) | 85 (69, 97) | 78 (66, 88) |
|  Hurd | 73 (58, 86) | 96 (87, 100) | 80 (69, 90) |
|  Wu | 78 (63, 90) | 93 (81, 100) | 83 (72, 92) |
| ***By Gender*** |  |
|  **Male** | **N = 265, Nobs = 405** |
|  H-W | 55 (45, 64) | 96 (93, 99) | 78 (73, 83) |
|  L-K-W | 72 (63, 80) | 87 (81, 92) | 80 (75, 85) |
|  Crimmins | 72 (63, 80) | 92 (87, 95) | 83 (78, 87) |
|  Hurd | 70 (62, 79) | 95 (91, 98) | 84 (79, 88) |
|  Wu | 64 (55, 73) | 93 (88, 97) | 80 (75, 85) |
|  **Female** | **N = 386, Nobs = 644** |
|  H-W | 59 (52, 65) | 99 (98, 100) | 73 (69, 77) |
|  L-K-W | 82 (77, 86) | 91 (87, 95) | 85 (82, 88) |
|  Crimmins | 86 (82, 90) | 90 (85, 95) | 87 (84, 91) |
|  Hurd | 87 (83, 91) | 97 (94, 99) | 91 (88, 93) |
|  Wu | 88 (83, 91) | 92 (88, 96) | 89 (86, 92) |
| ***By Age*** |
|  **< 80 years old** | **N = 217, Nobs = 304** |
|  H-W | 49 (35, 62) | 98 (96, 100) | 84 (79, 88) |
|  L-K-W | 75 (64, 85) | 91 (86, 95) | 86 (82, 90) |
|  Crimmins | 65 (53, 76) | 96 (94, 99) | 87 (83, 91) |
|  Hurd | 61 (49, 73) | 100 (99, 100) | 89 (84, 92) |
|  Wu | 67 (54, 78) | 95 (92, 98) | 87 (83, 91) |
|  **80 years old +** | **N = 434, Nobs = 745** |
|  H-W | 59 (53, 64) | 98 (95, 99) | 71 (67, 75) |
|  L-K-W | 79 (75, 84) | 87 (82, 92) | 82 (78, 85) |
|  Crimmins | 84 (80, 88) | 86 (80, 91) | 85 (82, 88) |
|  Hurd | 86 (82, 90) | 92 (88, 96) | 88 (85, 91) |
|  Wu | 83 (79, 87) | 90 (85, 94) | 85 (82, 88) |
| ***By Education*** |
|  **< High school** | **N = 311, Nobs = 516** |
|  H-W | 58 (51, 64) | 95 (91, 98) | 71 (66, 75) |
|  L-K-W | 82 (77, 87) | 77 (70, 84) | 80 (76, 84) |
|  Crimmins | 80 (75, 85) | 84 (77, 90) | 81 (77, 85) |
|  Hurd | 80 (75, 85) | 94 (89, 98) | 85 (81, 89) |
|  Wu | 81 (76, 86) | 85 (78, 91) | 83 (78, 86) |
|  **High school +** | **N = 340, Nobs = 533** |
|  H-W | 57 (48, 65) | 100 (99, 100) | 79 (74, 84) |
|  L-K-W | 74 (67, 81) | 96 (94, 98) | 86 (82, 89) |
|  Crimmins | 83 (77, 89) | 96 (93, 98) | 90 (86, 93) |
|  Hurd | 85 (79, 90) | 97 (94, 99) | 91 (88, 94) |
|  Wu | 79 (73, 85) | 97 (95, 99) | 89 (85, 92) |
| Abbreviations: H-W = Herzog-Wallace; L-K-W = Langa-Kabeto-Weir  |

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| **eTable 5**. Comparison of Crimmins performance metrics in classifying dementia using different rules in in the training and validation data, overall, and by subgroups |
| **Algorithm** | **Training data** | **Validation data** |
| **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** | **Sensitivity% (95% CI)** | **Specificity% (95% CI)** | **Accuracy% (95% CI)** |
| ***Overall*** | **N/Nobs = 760** | **N = 376, Nobs=515** |
| P(dem) > 0.5  | 78 (72, 83) | 89 (86, 92) | 85 (83, 88) | 42 (31, 54) | 91 (88, 94) | 84 (81, 88) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 81 (76, 86) | 87 (84, 90) | 85 (82, 88) | 46 (35, 58) | 89 (85, 93) | 83 (80, 87) |
| ***By respondent status*** |
|  **Self** | **N/Nobs = 595** | **N = 351, Nobs = 485** |
| P(dem) > 0.5  | 58 (49, 67) | 93 (91, 95) | 86 (83, 88) | 35 (23, 49) | 93 (90, 96) | 87 (83, 90) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 65 (57, 73) | 91 (88, 93) | 85 (82, 88) | 41 (28, 54) | 91 (88, 94) | 85 (82, 89) |
|  **Proxy** | **N/Nobs = 165** | **N = 25, Nobs = 30** |
| P(dem) > 0.5  | 96 (93, 99) | 36 (20, 53) | 84 (78, 90) | 67 (41, 90) | 33 (9, 62) | 50 (32, 69) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 96 (93, 99) | 36 (20, 53) | 84 (78, 90) | 67 (41, 90) | 33 (9, 62) | 50 (32, 69) |
| ***By race/ethnicity*** |
|  **NH White** | **N/Nobs = 526** | **N = 271, Nobs = 369** |
| P(dem) > 0.5  | 79 (72, 85) | 92 (88, 94) | 87 (84, 90) | 45 (31, 60) | 93 (89, 96) | 87 (83, 91) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 83 (77, 88) | 90 (86, 93) | 87 (84, 90) | 52 (37, 67) | 91 (87, 95) | 86 (82, 90) |
|  **NH Black** | **N/Nobs=140** | **N = 65, Nobs = 97** |
| P(dem) > 0.5  | 76 (65, 87) | 83 (74, 91) | 80 (73, 87) | 33 (9, 59) | 88 (79, 95) | 80 (71, 88) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 78 (67, 88) | 79 (70, 88) | 79 (72, 85) | 33 (9, 59) | 87 (78, 94) | 79 (69, 86) |
|  **Hispanic** | **N/Nobs=76** | **N = 31, Nobs = 35** |
| P(dem) > 0.5  | 80 (60, 95) | 86 (76, 94) | 84 (76, 92) | 29 (0, 63) | 84 (68, 96) | 69 (52, 84) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 80 (60, 95) | 84 (74, 93) | 83 (74, 91) | 29 (0, 63) | 84 (68, 96) | 69 (52, 84) |
| ***By gender*** |
|  **Male** | **N/Nobs = 308** | **N = 182, Nobs = 255** |
| P(dem) > 0.5 | 71 (60, 80) | 89 (85, 93) | 84 (80, 88) | 40 (23, 58) | 92 (88, 96) | 86 (81, 90) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 73 (63, 82) | 88 (84, 92) | 84 (80, 88) | 46 (28, 65) | 91 (87, 95) | 86 (81, 90) |
|  **Female** | **N/Nobs = 452** | **N = 194, Nobs = 270** |
| P(dem) > 0.5  | 81 (75, 86) | 89 (85, 93) | 86 (83, 89) | 44 (29, 60) | 91 (85, 95) | 83 (78, 88) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 85 (79, 90) | 86 (82, 90) | 86 (82, 89) | 46 (31, 62) | 87 (81, 93) | 81 (75, 86) |
| ***By age*** |
|  **< 80** | **N/Nobs = 364** | **N = 170, Nobs = 225** |
| P(dem) > 0.5  | 63 (52, 75) | 95 (92, 97) | 89 (86, 92) | 35 (13, 60) | 96 (93, 99) | 92 (88, 95) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 66 (55, 78) | 94 (91, 96) | 88 (85, 92) | 35 (13, 60) | 95 (92, 98) | 91 (87, 94) |
|  **80+** | **N/Nobs = 396** | **N = 206, Nobs = 290** |
| P(dem) > 0.5  | 83 (77, 88) | 81 (75, 86) | 82 (78, 86) | 44 (31, 58) | 87 (81, 92) | 79 (73, 84) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 86 (81, 91) | 78 (72, 83) | 82 (78, 85) | 50 (36, 63) | 84 (78, 90) | 78 (72, 83) |
| ***By education*** |
|  **< High school** | **N/Nobs = 369** | **N = 157, Nobs = 215** |
| P(dem) > 0.5  | 76 (69, 83) | 82 (77, 87) | 80 (75, 84) | 39 (25, 55) | 84 (77, 91) | 75 (69, 82) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 77 (70, 84) | 80 (74, 85) | 79 (75, 83) | 39 (25, 55) | 83 (75, 89) | 74 (67, 80) |
|  **High school +** | **N/Nobs = 391** | **N = 219, Nobs = 300** |
| P(dem) > 0.5  | 80 (72, 86) | 95 (93, 98) | 91 (88, 93) | 46 (28, 65) | 96 (92, 98) | 91 (87, 94) |
| P(dem) > P(normal) and P(dem) > P(CIND) | 86 (79, 92) | 93 (90, 96) | 91 (88, 94) | 57 (38, 76) | 93 (90, 97) | 90 (86, 94) |
| Abbreviations: CIND = Cognitive impairment, no dementia |

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| **eTable 6.** Sensitivity, specificity, and overall accuracy at alternate cut-points to achieve certain performance metrics |
| **Performance** | **Crimmins** | **Hurd** | **Wu** |
| **Cut-point** | **Sensitivity** | **Specificity** | **Accuracy** | **Cut-point** | **Sensitivity** | **Specificity** | **Accuracy** | **Cut-point** | **Sensitivity** | **Specificity** | **Accuracy** |
| **% (95% CI)** | **% (95% CI)** | **% (95% CI)** |
| **HRS Training data (N/Nobs = 760)** |
| 98% Sensitivity | 0.08 | 98 (96, 100) | 58 (54, 63) | 72 (69, 75) | 0.10 | 98 (97, 100) | 65 (60, 69) | 76 (73, 79) | 0.04 | 98 (96, 100) | 51 (47, 55) | 67 (64, 70) |
| 95% Sensitivity | 0.15 | 95 (92, 97) | 70 (66, 74) | 79 (76, 82) | 0.15 | 95 (92, 97) | 73 (69, 76) | 80 (77, 83) | 0.11 | 95 (92, 97) | 67 (63, 71) | 76 (73, 79) |
| 90% Sensitivity | 0.26 | 91 (87, 94) | 80 (76, 83) | 83 (81, 86) | 0.22 | 90 (87, 94) | 79 (75, 82) | 83 (80, 85) | 0.20 | 90 (87, 94) | 78 (75, 82) | 82 (80, 85) |
|   |   |  |  |  |   |  |  |  |   |  |  |   |
| 98% Specificity | 0.85 | 54 (48, 60) | 98 (97, 99) | 83 (81, 86) | 0.73 | 61 (55, 67) | 98 (97, 99) | 85 (83, 88) | 0.91 | 54 (48, 60) | 98 (97, 99) | 83 (81, 86) |
| 95% Specificity | 0.73 | 65 (59, 71) | 95 (93, 97) | 85 (82, 88) | 0.62 | 67 (62, 73) | 95 (93, 97) | 86 (83, 88) | 0.81 | 63 (57, 69) | 95 (93, 97) | 84 (82, 87) |
| 90% Specificity | 0.52 | 75 (70, 80) | 90 (87, 93) | 85 (82, 88) | 0.45 | 81 (76, 85) | 90 (87, 93) | 87 (84, 89) | 0.63 | 75 (69, 80) | 90 (88, 93) | 85 (82, 88) |
|   |   |  |  |  |   |  |  |  |   |  |  |   |
| Max accuracy a  | 0.38 | 85 (81, 90) | 86 (83, 89) | 86 (83, 88) | 0.39 | 84 (80, 89) | 88 (85, 91) | **87 (85, 89)** | 0.68 | 72 (66, 78) | 92 (89, 94) | **85 (83, 88)** |
| Max accuracy a | NA  |  |  |  | 0.53 | 75 (70, 80) | 93 (91, 95) | **87 (84, 89)** | NA  |  |  |   |
| **HRS Validation data (N = 376/Nobs = 515)** |
| 98% Sensitivity | 0.03 | 99 (95, 100) | 36 (30, 41) | 44 (40, 49) | 0.02 | 99 (95, 100) | 39 (34, 44) | 47 (42, 52) | 0.01 | 99 (95, 100) | 43 (37, 48) | 50 (46, 55) |
| 95% Sensitivity | 0.06 | 95 (89, 99) | 51 (45, 56) | 57 (52, 62) | 0.05 | 95 (89, 99) | 55 (50, 61) | 61 (56, 65) | 0.02 | 95 (88, 99) | 46 (41, 51) | 53 (48, 57) |
| 90% Sensitivity | 0.08 | 90 (83, 97) | 60 (54, 65) | 64 (59, 68) | 0.05 | 90 (83, 97) | 57 (52, 62) | 62 (57, 66) | 0.03 | 90 (83, 97) | 55 (50, 60) | 60 (55, 65) |
|   |   |  |  |  |   |  |  |  |   |  |  |   |
| 98% Specificity | 0.80 | 17 (9, 26) | 98 (96, 99) | 87 (84, 90) | 0.58 | 32 (22, 44) | 98 (97, 99) | 89 (86, 92) | 0.81 | 25 (15, 36) | 98 (97, 99) | 88 (85, 91) |
| 95% Specificity | 0.65 | 34 (23, 45) | 95 (93, 97) | 87 (84, 90) | 0.45 | 42 (31, 54) | 95 (93, 97) | 88 (85, 91) | 0.63 | 36 (25, 48) | 95 (93, 97) | 87 (84, 90) |
| 90% Specificity | 0.44 | 49 (38, 61) | 90 (86, 93) | 84 (80, 88) | 0.28 | 54 (42, 65) | 90 (87, 93) | 85 (82, 88) | 0.37 | 54 (42, 65) | 90 (87, 93) | 85 (82, 88) |
|   |   |  |  |  |   |  |  |  |   |  |  |   |
| Max accuracy  | 0.87 | 13 (5, 21) | 99 (98, 100) | 87 (84, 90) | 0.66 | 28 (18, 39) | 99 (98, 100) | **89 (86, 92)** | 0.80 | 27 (17, 37) | 98 (97, 99) | **88 (86, 91)** |
|  a Multiple cut-points provided where applicable, Abbreviations: NA, not applicable |