

Supplementary figure

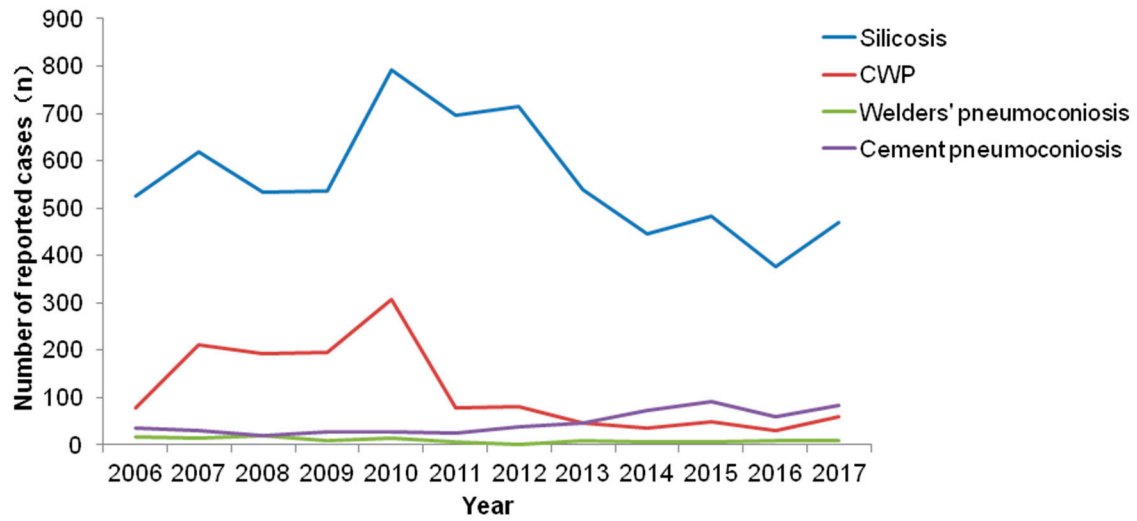


Figure S1. Changes in the number of pneumoconiosis cases reported from 2006 to 2017.

Changes in the classification of pneumoconiosis cases reported from 2006 to 2017

Supplementary Table

Table S1. Division standard of enterprise scale

| Industry type | Large | | | Medium | | | Small | | | Micro | | |
|---|--------------------------------|------------------|---------------------|--------------------------------|------------------|---------------------|--------------------------------|------------------|---------------------|--------------------------------|------------------|---------------------|
| | Operation revenue (million) | Employees (n) | Assets (million) | Operation revenue (million) | Employees (n) | Assets (million) | Operation revenue (million) | Employees (n) | Assets (million) | Operation revenue (million) | Employees (n) | Assets (million) |
| Agriculture, forestry, animal husbandry and fishery | ≥200 | — | — | [5,200) | — | — | [0.5,5) | — | — | <0.5 | — | — |
| Industry | ≥400 | ≥1000 | — | [20,400) | [300,1000) | — | [3,20) | [20,300) | — | <3 | <20 | — |
| Construction industry | ≥800 | — | ≥800 | [60,800) | — | [50,800) | [3,60) | — | [3,50) | <3 | — | <3 |
| Communications and transportation industry | ≥300 | ≥1000 | — | [30,300) | [300,1000) | — | [2,30) | [20,300) | — | <2 | <20 | — |
| Warehousing industry | ≥300 | ≥200 | — | [10,300) | [100,200) | — | [1,10) | [20,100) | — | <1 | <20 | — |
| Real-estate industry | ≥2000 | — | ≥100 | [10,2000) | — | [50,100) | [1,10) | — | [20,50) | <1 | — | <20 |
| Other | — | ≥300 | — | — | [100,300) | — | — | [10,100) | — | — | <10 | — |

Table S2. Changes in the number of pneumoconiosis cases reported from 2006 to 2017

| Year | Silicosis | | CWP | | Welders' pneumoconiosis | | Cement pneumoconiosis | | Other | | Total | |
|-------|-----------|------|------|------|-------------------------|------|-----------------------|-----|-------|-----|-------|-------|
| | n | % | n | % | n | % | n | % | n | % | n | % |
| 2006 | 526 | 76.8 | 79 | 11.5 | 35 | 5.1 | 16 | 2.3 | 29 | 4.2 | 685 | 100.0 |
| 2007 | 618 | 68.4 | 211 | 23.3 | 30 | 3.3 | 13 | 1.4 | 32 | 3.5 | 904 | 100.0 |
| 2008 | 533 | 66.5 | 192 | 23.9 | 19 | 2.4 | 19 | 2.4 | 39 | 4.9 | 802 | 100.0 |
| 2009 | 537 | 63.8 | 194 | 23.0 | 27 | 3.2 | 8 | 1.0 | 76 | 9.0 | 842 | 100.0 |
| 2010 | 791 | 65.9 | 307 | 25.6 | 28 | 2.3 | 14 | 1.2 | 61 | 5.1 | 1201 | 100.0 |
| 2011 | 695 | 82.6 | 79 | 9.4 | 25 | 3.0 | 5 | 0.6 | 37 | 4.4 | 841 | 100.0 |
| 2012 | 715 | 81.8 | 80 | 9.2 | 37 | 4.2 | 2 | 0.2 | 40 | 4.6 | 874 | 100.0 |
| 2013 | 540 | 80.6 | 45 | 6.7 | 45 | 6.7 | 8 | 1.2 | 32 | 4.8 | 670 | 100.0 |
| 2014 | 447 | 74.1 | 35 | 5.8 | 72 | 11.9 | 6 | 1.0 | 43 | 7.1 | 603 | 100.0 |
| 2015 | 483 | 72.6 | 48 | 7.2 | 91 | 13.7 | 5 | 0.8 | 38 | 5.7 | 665 | 100.0 |
| 2016 | 377 | 75.4 | 30 | 6.0 | 59 | 11.8 | 8 | 1.6 | 26 | 5.2 | 500 | 100.0 |
| 2017 | 470 | 71.6 | 59 | 9.0 | 83 | 12.7 | 9 | 1.4 | 35 | 5.3 | 656 | 100.0 |
| Total | 6732 | 72.9 | 1359 | 14.1 | 551 | 6.4 | 113 | 1.3 | 488 | 5.3 | 9243 | 100.0 |

Table S3. Changes in the stages of total pneumoconiosis cases reported from 2006 to 2017

| Year | New reported cases(n) | Stage I | | Stage II | | Stage III | |
|-------|-----------------------|---------|------|----------|------|-----------|------|
| | | n | % | n | % | n | % |
| 2006 | 685 | 462 | 67.4 | 172 | 25.1 | 51 | 7.4 |
| 2007 | 904 | 583 | 64.5 | 258 | 28.5 | 63 | 7.0 |
| 2008 | 802 | 629 | 78.4 | 138 | 17.2 | 35 | 4.4 |
| 2009 | 842 | 623 | 74.0 | 154 | 18.3 | 65 | 7.7 |
| 2010 | 1201 | 981 | 81.7 | 133 | 11.1 | 87 | 7.2 |
| 2011 | 841 | 632 | 75.1 | 102 | 12.1 | 107 | 12.7 |
| 2012 | 874 | 662 | 75.7 | 133 | 15.2 | 79 | 9.0 |
| 2013 | 670 | 498 | 74.3 | 97 | 14.5 | 75 | 11.2 |
| 2014 | 603 | 449 | 74.5 | 78 | 12.9 | 76 | 12.6 |
| 2015 | 665 | 502 | 75.5 | 86 | 12.9 | 77 | 11.6 |
| 2016 | 500 | 391 | 78.2 | 68 | 13.6 | 41 | 8.2 |
| 2017 | 656 | 507 | 77.3 | 96 | 14.6 | 53 | 8.1 |
| Total | 9243 | 6919 | 74.9 | 1515 | 16.4 | 809 | 8.8 |

Table S4. Changes in the stages of different pneumoconiosis cases reported from 2006 to 2015

| Year | Silicosis | | | | | | CWP | | | | | | Welders' pneumoconiosis | | | | | | Cement pneumoconiosis | | | | | |
|-------|-----------|------|----------|------|-----------|------|---------|------|----------|------|-----------|------|-------------------------|-------|----------|------|-----------|-----|-----------------------|-------|----------|------|-----------|------|
| | Stage I | | Stage II | | Stage III | | Stage I | | Stage II | | Stage III | | Stage I | | Stage II | | Stage III | | Stage I | | Stage II | | Stage III | |
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| 2006 | 345 | 69.5 | 139 | 26.4 | 42 | 8.0 | 55 | 69.6 | 18 | 22.8 | 6 | 7.6 | 27 | 77.1 | 8 | 22.9 | 0 | 0.0 | 15 | 93.8 | 1 | 6.2 | 0 | 0.0 |
| 2007 | 383 | 65.5 | 179 | 29.0 | 56 | 9.1 | 136 | 64.5 | 70 | 33.2 | 5 | 2.4 | 25 | 83.3 | 5 | 16.7 | 0 | 0.0 | 13 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2008 | 406 | 80.3 | 101 | 18.9 | 26 | 4.9 | 170 | 88.5 | 20 | 10.4 | 2 | 1.0 | 19 | 100.0 | 0 | 0.0 | 0 | 0.0 | 19 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2009 | 390 | 80.7 | 99 | 18.4 | 48 | 8.9 | 146 | 75.3 | 35 | 18.0 | 13 | 6.7 | 25 | 92.6 | 2 | 7.4 | 0 | 0.0 | 7 | 87.5 | 0 | 0.0 | 1 | 12.5 |
| 2010 | 629 | 82.1 | 97 | 12.3 | 65 | 8.2 | 277 | 90.2 | 15 | 4.9 | 15 | 4.9 | 21 | 75.0 | 6 | 21.4 | 1 | 3.6 | 12 | 85.7 | 2 | 14.3 | 0 | 0.0 |
| 2011 | 522 | 75.1 | 85 | 12.2 | 88 | 12.7 | 57 | 72.2 | 6 | 7.6 | 16 | 20.3 | 18 | 72.0 | 6 | 24.0 | 1 | 4.0 | 5 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2012 | 552 | 77.2 | 94 | 13.1 | 69 | 9.7 | 55 | 68.8 | 21 | 26.2 | 4 | 5.0 | 25 | 67.6 | 11 | 29.7 | 1 | 2.7 | 1 | 50.0 | 0 | 0.0 | 1 | 50.0 |
| 2013 | 401 | 74.3 | 76 | 14.1 | 63 | 11.7 | 29 | 64.4 | 9 | 20.0 | 7 | 15.6 | 41 | 91.1 | 4 | 8.9 | 0 | 0.0 | 8 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2014 | 317 | 70.9 | 62 | 13.9 | 68 | 15.2 | 26 | 74.3 | 4 | 11.4 | 5 | 14.3 | 69 | 95.8 | 2 | 2.8 | 1 | 1.4 | 6 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2015 | 342 | 70.8 | 74 | 15.3 | 67 | 13.9 | 34 | 70.8 | 6 | 12.5 | 8 | 16.7 | 91 | 100.0 | 0 | 0.0 | 0 | 0.0 | 5 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2016 | 287 | 76.1 | 54 | 14.3 | 36 | 9.5 | 24 | 80.0 | 5 | 16.7 | 1 | 3.3 | 57 | 96.6 | 1 | 1.7 | 1 | 1.7 | 7 | 87.5 | 1 | 12.5 | 0 | 0.0 |
| 2017 | 357 | 76.0 | 67 | 14.3 | 46 | 9.8 | 46 | 78.0 | 10 | 16.9 | 3 | 5.1 | 79 | 95.2 | 4 | 4.8 | 0 | 0.0 | 4 | 44.4 | 4 | 44.4 | 1 | 11.1 |
| Total | 4931 | 73.2 | 1127 | 16.7 | 674 | 10.0 | 1055 | 77.6 | 219 | 16.1 | 85 | 6.3 | 497 | 90.2 | 49 | 8.9 | 5 | 0.9 | 102 | 90.3 | 8 | 7.1 | 3 | 2.7 |

Table S5. Industry distribution of silicosis cases from 2006 to 2017

| Industry | Number of cases (n) | Percentage(%) |
|------------------------|---------------------|---------------|
| Public administration | 2763 | 41.0 |
| Geological and mineral | 2272 | 33.7 |
| Coal | 550 | 8.2 |
| Machine manufacture | 420 | 6.2 |
| Construction | 189 | 2.8 |
| Nonferrous metals | 178 | 2.6 |
| Construction materials | 71 | 1.1 |
| Other | 289 | 4.3 |
| Total | 6732 | 100.0 |

Table S6. Industry distribution of CWP cases from 2006 to 2017

| Industry | Number of cases (n) | Percentage(%) |
|------------------------|---------------------|---------------|
| Coal | 1065 | 78.4 |
| Electric power | 77 | 5.7 |
| Public administration | 76 | 5.6 |
| Geological and mineral | 27 | 2.0 |
| Nonferrous metals | 27 | 2.0 |
| Machine manufacture | 22 | 1.6 |
| Other | 65 | 4.8 |
| Total | 1359 | 100.0 |

Table S7. Industry distribution of Welders' pneumoconiosis cases from 2006 to 2017

| Industry | Number of cases (n) | Percentage(%) |
|------------------------|---------------------|---------------|
| Machine manufacture | 287 | 52.1 |
| Public administration | 79 | 14.3 |
| Nonferrous metals | 51 | 9.3 |
| Geological and mineral | 30 | 5.4 |
| Coal | 17 | 3.1 |
| Construction materials | 15 | 2.7 |
| Transportation | 14 | 2.5 |
| Electric power | 13 | 2.4 |
| Chemical | 12 | 2.2 |
| Other | 33 | 6.0 |
| Total | 551 | 100.0 |

Table S8. Industry distribution of Cement pneumoconiosis cases from 2006 to 2017

| Industry | Number of cases (n) | Percentage(%) |
|------------------------|---------------------|---------------|
| Geological and mineral | 77 | 68.1 |
| Public administration | 14 | 12.4 |
| Construction materials | 8 | 7.1 |
| Coal | 4 | 3.5 |
| Construction | 4 | 3.5 |
| Machine manufacture | 2 | 1.8 |
| Transportation | 1 | 0.9 |
| Other | 3 | 2.7 |
| Total | 113 | 100.0 |

Table S9. Distribution of working types of silicosis cases from 2006 to 2017

| Working type | Number of cases (n) | Percentage(%) |
|---------------------|---------------------|---------------|
| Drilling | 2660 | 39.5 |
| Driving | 984 | 14.6 |
| Hauling | 447 | 6.6 |
| Smashing | 430 | 6.4 |
| Blasting | 245 | 3.6 |
| Masonry | 243 | 3.6 |
| Crushing | 174 | 2.6 |
| Welding | 114 | 1.7 |
| Cleaning sand | 114 | 1.7 |
| Mining | 107 | 1.6 |
| Raw material worker | 87 | 1.3 |
| Other | 1127 | 16.7 |
| Total | 6732 | 100.0 |

Table S10. Distribution of working types of CWP cases from 2006 to 2017

| Working type | Number of cases (n) | Percentage(%) |
|-----------------------|---------------------|---------------|
| Coal mixed production | 648 | 47.7 |
| Coal mining | 250 | 18.4 |
| Driving | 204 | 15.0 |
| Drilling | 40 | 2.9 |
| Hauling | 38 | 2.8 |
| Welding | 12 | 0.9 |
| Other | 167 | 12.3 |
| Total | 1359 | 100.0 |

Table S11. Distribution of working types of Welders' pneumoconiosis cases from 2006 to 2017

| Working type | Number of cases (n) | Percentage(%) |
|--------------|---------------------|---------------|
| Welding | 546 | 99.1 |
| Other | 5 | 0.9 |
| Total | 551 | 100.0 |

Table S12. Distribution of working types of Cement pneumoconiosis cases from 2006 to 2017

| Working type | Number of cases (n) | Percentage(%) |
|----------------------------|---------------------|---------------|
| Cement production | 16 | 14.2 |
| Cement raw material worker | 13 | 11.5 |
| Crushing | 11 | 9.7 |
| Drilling | 10 | 8.8 |
| Packaging | 8 | 7.1 |
| Encastage | 7 | 6.2 |
| Driving | 4 | 3.5 |
| Firing | 4 | 3.5 |
| Smashing | 3 | 2.7 |
| Raw material worker | 3 | 2.7 |
| Hauling | 3 | 2.7 |
| Mining | 1 | 0.9 |
| Transportation | 1 | 0.9 |
| Other | 29 | 25.7 |
| Total | 113 | 100.0 |

Table S13. The trend of the average exposure duration of different pneumoconiosis cases from 2006 to 2015

| Year | Silicosis | | | | CWP | | | | Welders' pneumoconiosis | | | | Cement pneumoconiosis | | | |
|-------|-----------|-------------|----------|--------|------|-------------|----------|--------|-------------------------|-------------|----------|--------|-----------------------|-------------|-----------|--------|
| | n | Mean (SD) | Range | Median | n | Mean (SD) | Range | Median | n | Mean (SD) | Range | Median | n | Mean (SD) | Range | Median |
| 2006 | 526 | 20.1 (12.2) | 0.9-54.0 | 21.0 | 79 | 25.4 (8.5) | 3.8-43.9 | 25.5 | 35 | 16.4 (9.3) | 5.8-40.3 | 12.4 | 16 | 28.0 (5.8) | 15.9-35.5 | 27.5 |
| 2007 | 618 | 20.1 (11.6) | 0.6-58.0 | 20.0 | 211 | 24.4 (8.8) | 2.2-42.5 | 26.0 | 30 | 16.8 (8.6) | 6.1-35.0 | 14.1 | 13 | 23.8 (5.9) | 7.7-30.0 | 25.4 |
| 2008 | 533 | 15.8 (10.9) | 0.8-50.0 | 14.6 | 192 | 23.9 (8.7) | 2.8-39.0 | 26.1 | 19 | 18.0 (7.9) | 4.1-29.2 | 19.5 | 19 | 25.9 (5.7) | 15.2-38.5 | 26.4 |
| 2009 | 537 | 12.7 (9.7) | 0.7-48.0 | 9.0 | 194 | 23.9 (8.2) | 3.5-43.4 | 25.0 | 27 | 12.9 (7.1) | 3.6-33.3 | 11.0 | 8 | 18.2 (9.6) | 5.1-29.5 | 16.3 |
| 2010 | 791 | 13.9 (10.9) | 1.2-50.0 | 9.3 | 307 | 25.3 (7.6) | 2.5-39.8 | 27.1 | 28 | 16.1 (10.5) | 4.0-33.7 | 11.9 | 14 | 21.7 (6.9) | 7.9-31.8 | 23.3 |
| 2011 | 695 | 11.6 (9.8) | 0.9-54.0 | 6.7 | 79 | 21.6 (9.9) | 4.0-39.8 | 21.7 | 25 | 11.4 (7.4) | 2.2-35.0 | 9.7 | 5 | 20.2 (9.4) | 6.0-30.0 | 21.0 |
| 2012 | 715 | 11.5 (10.1) | 1.0-45.0 | 6.3 | 80 | 22.1 (10.0) | 3.5-38.0 | 23.6 | 37 | 12.5 (6.2) | 3.0-28.0 | 11.5 | 2 | 21.9 (7.5) | 16.6-27.2 | 21.9 |
| 2013 | 540 | 12.2 (9.9) | 1.4-45.4 | 8.0 | 45 | 20.4 (9.0) | 2.8-36.5 | 20.4 | 45 | 13.0 (7.5) | 2.8-42.7 | 10.3 | 8 | 22.1 (7.9) | 4.0-29.2 | 24.9 |
| 2014 | 447 | 12.7 (9.9) | 1.2-42.8 | 8.6 | 35 | 18.8 (9.0) | 4.0-36.8 | 17.9 | 72 | 11.8 (6.4) | 2.1-32.7 | 9.6 | 6 | 10.6 (7.0) | 4.0-21.3 | 8.0 |
| 2015 | 483 | 15.0 (10.4) | 0.5-43.4 | 12.0 | 48 | 26.1 (7.5) | 6.9-38.3 | 27.1 | 91 | 11.3 (3.9) | 6.8-27.1 | 10.3 | 5 | 10.5 (7.5) | 3.2-20.0 | 7.0 |
| 2016 | 377 | 13.5 (10.2) | 1.0-48.0 | 9.7 | 30 | 17.5 (8.7) | 6.0-34.0 | 15.5 | 59 | 12.2 (4.7) | 5.1-26.8 | 11.6 | 8 | 7.0 (2.2) | 4.3-10.8 | 6.3 |
| 2017 | 470 | 11.4 (9.3) | 1.5-41.1 | 6.3 | 59 | 20.9 (8.6) | 3.0-36.0 | 22.0 | 83 | 12.2 (4.3) | 4.3-26.2 | 11.2 | 9 | 12.9 (10.6) | 1.3-33.1 | 13.0 |
| Total | 6732 | 14.2 (10.9) | 0.5-58.0 | 10.2 | 1359 | 23.7 (8.7) | 2.2-43.9 | 25.3 | 551 | 13.0 (6.7) | 2.1-42.7 | 11.0 | 113 | 20.4 (9.3) | 1.3-38.5 | 23.0 |

*SD: Standard deviation

Table S14. The trend of the average diagnosis age of different pneumoconiosis cases from 2006 to 2015

| Year | Silicosis | | | | CWP | | | | Welders' pneumoconiosis | | | | Cement pneumoconiosis | | | |
|-------|-----------|-------------|-------|--------|------|-------------|-------|--------|-------------------------|-------------|-------|--------|-----------------------|-------------|-------|--------|
| | n | Mean (SD) | Range | Median | n | Mean (SD) | Range | Median | n | Mean (SD) | Range | Median | n | Mean (SD) | Range | Median |
| 2006 | 526 | 59.3 (9.4) | 29-82 | 59 | 79 | 60.5 (12.6) | 32-81 | 60 | 35 | 40.8 (10.5) | 28-76 | 39 | 16 | 52.8 (4.4) | 43-60 | 53 |
| 2007 | 618 | 59.1 (9.5) | 25-85 | 59 | 211 | 62.6 (10.6) | 33-87 | 64 | 30 | 40.4 (9.9) | 28-61 | 36.5 | 13 | 48.3 (6.3) | 39-58 | 50 |
| 2008 | 533 | 59.0 (9.9) | 28-83 | 59 | 192 | 55.7 (8.9) | 31-81 | 54 | 19 | 42.4 (8.6) | 28-57 | 41 | 19 | 53.6 (8.4) | 43-73 | 54 |
| 2009 | 537 | 59.6 (8.3) | 28-85 | 60 | 194 | 61.8 (11.1) | 35-85 | 63 | 27 | 39.7 (10.5) | 24-67 | 41 | 8 | 57.0 (13.1) | 46-86 | 53 |
| 2010 | 791 | 61.3 (8.8) | 29-89 | 62 | 307 | 54.7 (10.8) | 35-85 | 53 | 28 | 42.3 (12.0) | 28-71 | 43.5 | 14 | 54.6 (9.2) | 43-82 | 53 |
| 2011 | 695 | 61.5 (8.3) | 29-82 | 62 | 79 | 59.5 (12.4) | 36-88 | 60 | 25 | 38.2 (9.2) | 24-66 | 37 | 5 | 52.4 (12.3) | 39-69 | 48 |
| 2012 | 715 | 62.2 (9.2) | 33-88 | 62 | 80 | 58.9 (11.0) | 40-88 | 55 | 37 | 42.3 (6.2) | 26-63 | 43 | 2 | 58.0 (5.7) | 54-62 | 58 |
| 2013 | 540 | 61.7 (9.3) | 27-87 | 62 | 45 | 61.6 (10.6) | 38-79 | 64 | 45 | 42.5 (7.8) | 28-64 | 43 | 8 | 49.6 (6.3) | 45-64 | 47 |
| 2014 | 447 | 62.7 (9.2) | 27-87 | 64 | 35 | 61.5 (11.4) | 42-82 | 63 | 72 | 41.2 (6.9) | 26-63 | 43 | 6 | 55.5 (8.3) | 46-70 | 53.5 |
| 2015 | 483 | 63.5 (9.3) | 26-87 | 64 | 48 | 64.8 (10.5) | 40-82 | 65.5 | 91 | 42.4 (6.4) | 26-61 | 64 | 5 | 63.6 (5.2) | 59-72 | 61 |
| 2016 | 377 | 59.7 (10.9) | 28-83 | 63 | 30 | 61.8 (9.2) | 43-78 | 64 | 59 | 60.2 (11.7) | 32-78 | 64 | 8 | 67.0 (5.8) | 60-75 | 67 |
| 2017 | 470 | 50.5 (11.0) | 27-86 | 64 | 59 | 61.5 (11.7) | 29-86 | 64 | 83 | 62.5 (10.3) | 38-81 | 64 | 9 | 58.0 (11.7) | 45-74 | 52 |
| Total | 6732 | 60.8 (9.5) | 25-89 | 62 | 1359 | 59.1 (11.3) | 29-88 | 58 | 551 | 42.8 (12.6) | 24-81 | 45 | 113 | 54.8 (9.3) | 39-86 | 53 |

*SD: Standard deviation