**Supplementary Appendices**

**Cost-effectiveness of alternative strategies for annual influenza vaccination among children aged 6 months to 14 years in four provinces in China**

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Supplementary Table S1: General information of the five provinces/municipalities

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Province/Municipality | area, square km | population | GDP per capital (USD) | Population (6-14 years) | |
| 6-59 months | 5-14 years |
| Beijing | 16,410.54 | 20,186,000 | 10,328 | 401,842 | 1,285,158 |
| Shandong | 157,100 | 95,793,065 | 7006 | 3,590,682 | 11,483,618 |
| Henan | 167,000 | 94,020,000 | 4279 | 4,703,459 | 15,042,467 |
| Hunan | 211,800 | 71,193,400 | 4074 | 2,756,857 | 8,816,900 |
| Sichuan | 485,000 | 89,981,705 | 3195 | 3,250,094 | 10,394,356 |
| Total | 1,037,310.54 | 371,174,170 | - | 14,702,934 | 47,022,499 |

Source:

Population: China Statistic yearbook 2010 and estimation based on the ratio from WHO/Immunization country profile

Area and GDP: The Central People’s Government of The People’s Republic of China, http://www.gov.cn

Note: Exchange rate=6.77

Supplementary Table S2: Epidemiologic inputs by province, season, and age group Data Source

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input | Definition of inputs | Province | age group |  | Influenza seasons | | | | Source |
| 05/06 | 06/07 | 07/08 | 08/09 | 10/11 |
| p1 | No. of outpatient consultation persons per 100 persons with illness onset within 2 weeks (including all cause illness) | National | 6-59ms | 297.60 | 297.60 | 297.60 | 297.60 | 297.60 | ref # 12 |
| 60 ms-14 yrs | 109.20 | 109.20 | 109.20 | 109.20 | 109.20 |
| p2 | No. of ILI per 100 outpatient of age specific | Shandong | 6-59 ms | 1.27 | 0.82 | 0.64 | 0.81 | 0.82 | China CDC ILI sentinel surveillance data |
| 60 ms-14 yrs | 0.76 | 0.39 | 0.29 | 0.41 | 0.45 |
| Henan | 6-59 ms | 1.72 | 2.62 | 2.95 | 2.24 | 1.25 |
| 60 ms-14 yrs | 0.66 | 0.68 | 0.99 | 0.75 | 0.50 |
| Hunan | 6-59 ms | 2.40 | 2.59 | 2.93 | 2.49 | 3.30 |
| 60 ms-14 yrs | 0.79 | 0.46 | 0.72 | 0.85 | 0.79 |
| Sichuan | 6-59 ms | 0.62 | 0.22 | 0.27 | 0.38 | 1.30 |
| 60 ms-14 yrs | 0.42 | 0.19 | 0.16 | 0.22 | 0.53 |
| p3 | No. of influenza positive per 100 ILI with sample collection and lab test of age group specific | | 6-59 ms | 9.26 | 8.88 | 9.03 | 6.95 | 11.30 | China CDC ILI sentinel surveillance data |
| 60 ms-14 yrs | 22.72 | 16.15 | 17.18 | 16.52 | 14.77 |
| p4 | Median No. of ILI among outpatients in SARI sentinel hospital per 100 SARI hospitalization in same SARI sentinel hospital of age specific | | 6-59 ms | 563.00 | 563.00 | 563.00 | 563.00 | 563.00 | China CDC SARI sentinel surveillance data |
| 60 ms-14 yrs | 858.00 | 858.00 | 858.00 | 858.00 | 858.00 |
| p5 | No. of influenza positive per 100 SARI case of age specific | | 6ms-14 yrs | 14.97 | 14.97 | 14.97 | 14.97 | 14.97 | China CDC SARI sentinel surveillance data |

ms: months; yrs: yearsSupplementary Table S3: Current situation: influenza vaccination coverage rates among target populations by province, season and age group, influenza vaccine effectiveness by season for all ages

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Province | Age Group | Seasons | | | | | | Data Source |
| 05/06 | 06/07 | 07/08 | 08/09 | 10/11 | 11/12 |
| The influenza vaccination coverage rate (VCR) among target population (%) | Beijing | 6-59 ms | 5.06 | 3.97 | 6.92 | 17.90 | 26.10 | 15.81 | VCR of season 05-09 are assumed as ratio of sales vs population, and VCR of two age groups are assumed the same; VCR of 10/11 and 11/12 were from a survey by China CDC in 2011 |
| 60 ms-14yrs | 5.06 | 3.97 | 6.92 | 17.90 | 47.70 | 26.32 |
| Shandong | 6-59 ms | 2.24 | 2.35 | 3.84 | 3.87 | 25.40 | 22.46 |
| 60 ms-14yrs | 2.24 | 2.35 | 3.84 | 3.87 | 26.90 | 14.80 |
| Henan | 6-59 ms | 2.45 | 2.32 | 1.90 | 2.41 | 37.69 | 29.97 |
| 60 ms-14yrs | 2.45 | 2.32 | 1.90 | 2.41 | 39.09 | 23.86 |
| Hunan | 6-59 ms | 1.18 | 1.22 | 3.37 | 3.32 | 37.30 | 33.44 |
| 60 ms-14yrs | 1.18 | 1.22 | 3.37 | 3.32 | 37.20 | 22.76 |
| Sichuan | 6-59 ms | 1.65 | 1.77 | 4.53 | 3.03 | 31.44 | 25.33 |
|  | 60 ms-14yrs | 1.65 | 1.77 | 4.53 | 3.03 | 34.69 | 18.62 |
| Effectiveness of influenza vaccine | national | all age | 63.00% | 52.00% | 68.00% | 61.00% | 61.00% | 61.00% | ref # 13 |
| 95% CI | 15-84% | 23-70% | 46-81% | NA | NA | NA |

ms: months; yrs: years

Supplementary Table S4: Number of influenza cases and cases averted by vaccination program

S4-a: Number of outpatient cases and cases averted by vaccination program

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age group | Province | 05/06 | | 06/07 | | 07/08 | | 08/09 | | 10/11 | |
| #case | #averted | #case | #averted | #case | #averted | #case | #averted | #case | #averted |
| 6-59ms | Shandong | 12567 | 180 | 7781 | 96 | 6176 | 166 | 6016 | 146 | 9902 | 1815 |
| Henan | 22294 | 349 | 32566 | 398 | 37287 | 487 | 21791 | 325 | 19771 | 5903 |
| Hunan | 18233 | 137 | 18869 | 120 | 21707 | 509 | 14198 | 293 | 30594 | 9011 |
| Sichuan | 5553 | 58 | 1890 | 18 | 2358 | 75 | 2554 | 48 | 14209 | 3372 |
| 60ms-14yrs | Shandong | 21653 | 310 | 7898 | 98 | 6248 | 168 | 8494 | 205 | 8335 | 1636 |
| Henan | 24632 | 386 | 18039 | 221 | 27938 | 365 | 20352 | 303 | 12131 | 3798 |
| Hunan | 17281 | 130 | 7153 | 46 | 11910 | 279 | 13520 | 279 | 11234 | 3298 |
| Sichuan | 10831 | 114 | 3483 | 32 | 3120 | 99 | 4125 | 78 | 8885 | 2385 |

S4-b: Number of inpatient cases and cases averted by vaccination program

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age group | Province | 05/06 | | 06/07 | | 07/08 | | 08/09 | | 10/11 | |
| #case | #averted | #case | #averted | #case | #averted | #case | #averted | #case | #averted |
| 6-59ms | Shandong | 3609 | 52 | 2330 | 29 | 1818 | 49 | 2301 | 56 | 2330 | 427 |
| Henan | 6402 | 100 | 9751 | 119 | 10980 | 143 | 8337 | 124 | 4652 | 1389 |
| Hunan | 5236 | 39 | 5650 | 36 | 6392 | 150 | 5432 | 112 | 7199 | 2120 |
| Sichuan | 1595 | 17 | 566 | 5 | 694 | 22 | 977 | 18 | 3343 | 793 |
| 60ms-14yrs | Shandong | 1663 | 24 | 853 | 11 | 635 | 17 | 897 | 22 | 985 | 193 |
| Henan | 1892 | 30 | 1949 | 24 | 2837 | 37 | 2150 | 32 | 1433 | 449 |
| Hunan | 1327 | 10 | 773 | 5 | 1209 | 28 | 1428 | 30 | 1327 | 390 |
| Sichuan | 832 | 9 | 376 | 3 | 317 | 10 | 436 | 8 | 1050 | 282 |

ms: months; yrs: years

Supplementary Table S5: Current situation: Cost effectiveness of influenza vaccination program in season 05/06-10/11, 09/10 not included; by province, season and age group

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age group | Province | 05/06 | | | | 06/07 | | | | 07/08 | | | | 08/09 | | | | 10/11 | | | |
| $  health care saved | $ pro-gram | net cost | $/case adver-ted | $  health care saved | $ pro-gram | net cost | $/case adver-ted | $  health care saved | $ pro-gram | net cost | $/case adver-ted | $  health care saved | $ pro-gram | net cost | $/case adver-ted | $  health care saved | $ pro-gram | net cost | $/case adver-ted |
| 6-59 ms | Shandong | 3219 | 2069 | -1150 | -5 | 1785 | 2168 | 383 | 3 | 3029 | 3546 | 517 | 2 | 3360 | 3571 | 211 | 1 | 27299 | 20716 | -6583 | -3 |
| Henan | 6236 | 2955 | -3281 | -7 | 7384 | 2807 | -4577 | -9 | 8897 | 2290 | -6606 | -10 | 7502 | 2910 | -4592 | -10 | 88762 | 36209 | -52553 | -7 |
| Hunan | 2445 | 837 | -1608 | -9 | 2234 | 864 | -1370 | -9 | 9292 | 2384 | -6908 | -10 | 6774 | 2350 | -4424 | -11 | 135510 | 23681 | -111829 | -10 |
| Sichuan | 1042 | 1377 | 335 | 4 | 325 | 1475 | 1150 | 51 | 1368 | 3779 | 2411 | 25 | 1110 | 2528 | 1418 | 21 | 50700 | 21147 | -29553 | -7 |
| 60 ms-14 yrs | Shandong | 1977 | 6616 | 4639 | 14 | 790 | 6933 | 6144 | 57 | 1296 | 11341 | 10045 | 54 | 1633 | 11422 | 9789 | 43 | 14121 | 43657 | 29536 | 16 |
| Henan | 2456 | 9452 | 6995 | 17 | 1782 | 8976 | 7194 | 29 | 2818 | 7324 | 4506 | 11 | 2411 | 9305 | 6894 | 21 | 32782 | 92195 | 59412 | 14 |
| Hunan | 826 | 2677 | 1851 | 13 | 369 | 2763 | 2394 | 47 | 2155 | 7624 | 5469 | 18 | 2220 | 7516 | 5296 | 17 | 28461 | 51547 | 23086 | 6 |
| Sichuan | 724 | 4403 | 3679 | 30 | 261 | 4718 | 4457 | 125 | 765 | 12086 | 11321 | 104 | 617 | 8086 | 7469 | 87 | 20584 | 49716 | 29132 | 11 |

Supplementary Table S6: A: cost-effectiveness of the twoOPTIONS

6-A: Cost-effectiveness of OPTION 1-reminder; by province and age group

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age group | Province | 5% | | | | | 10% | | | | | 15% | | | | |
| △case averted | △health care $ saved | △cost of program | △Net Cost | ICER | △case averted | △health care $ saved | △cost of program | △Net Cost | ICER | △case averted | △health care $ saved | △cost of program | △Net Cost | ICER |
| 6-59 ms | Shandong | 112 | 1365 | 2536864 | 2535499 | 22612 | 224 | 2730 | 2538036 | 2535306 | 11305 | 336 | 4095 | 892675 | 888580 | 2642 |
| Henan | 365 | 4438 | 3329573 | 3325135 | 9120 | 729 | 8876 | 3331850 | 3322974 | 4557 | 1094 | 13314 | 1739164 | 1725849 | 1578 |
| Hunan | 557 | 6775 | 1948828 | 1942053 | 3489 | 1113 | 13551 | 1950149 | 1936598 | 1740 | 1670 | 20326 | 1006158 | 985831 | 590 |
| Sichuan | 208 | 2535 | 2299132 | 2296597 | 11028 | 416 | 5070 | 2300445 | 2295375 | 5511 | 625 | 7605 | 1002204 | 994599 | 1592 |
| 60 ms-14 yrs | Shandong | 91 | 706 | 2572641 | 2571935 | 28118 | 183 | 1412 | 2576609 | 2575197 | 14077 | 274 | 2118 | 3050035 | 3047917 | 11107 |
| Henan | 212 | 1639 | 3384370 | 3382730 | 15930 | 425 | 3278 | 3391922 | 3388644 | 7979 | 637 | 4917 | 5796661 | 5791743 | 9092 |
| Hunan | 184 | 1423 | 1981691 | 1980268 | 10742 | 369 | 2846 | 1985903 | 1983057 | 5378 | 553 | 4269 | 3233223 | 3228954 | 5838 |
| Sichuan | 133 | 1029 | 2340257 | 2339228 | 17545 | 267 | 2058 | 2344889 | 2342830 | 8786 | 400 | 3088 | 3561455 | 3558368 | 8896 |

S6-B: cost-effectiveness of OPTION 2- sending free influenza vaccination voucher and expanding vaccination sites

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age group | Province | 10% | | | | | 15% | | | | | 25% | | | | |
| △case averted | △health care $ saved | △cost of program | △Net Cost | ICER | △case averted | △health care $ saved | △cost of program | △Net Cost | ICER | △case averted | △health care $ saved | △cost of program | △Net Cost | ICER |
| 6-59 ms | Shandong | 224 | 2730 | 7339348 | 7336618 | 32715 | 336 | 4095 | 8766631 | 8762536 | 26049 | 561 | 6825 | 9294553 | 9287728 | 16566 |
| Henan | 729 | 8876 | 12943909 | 12935033 | 17739 | 1094 | 13314 | 15427005 | 15413691 | 14092 | 1823 | 22190 | 18070026 | 18047836 | 9901 |
| Hunan | 1113 | 13551 | 7538036 | 7524485 | 6759 | 1670 | 20326 | 9005400 | 8985074 | 5381 | 2783 | 33877 | 10479182 | 10445305 | 3753 |
| Sichuan | 416 | 5070 | 7844137 | 7839067 | 18821 | 625 | 7605 | 9391126 | 9383521 | 15020 | 1041 | 12675 | 10415550 | 10402875 | 9991 |
| 60 ms-14 yrs | Shandong | 183 | 1412 | 20812042 | 20810630 | 113757 | 274 | 2118 | 24968753 | 24966635 | 90983 | 457 | 3530 | 31507530 | 31503999 | 68884 |
| Henan | 425 | 3278 | 38349569 | 38346291 | 90291 | 637 | 4917 | 45982163 | 45977245 | 72172 | 1062 | 8196 | 59965608 | 59957413 | 56471 |
| Hunan | 369 | 2846 | 21467753 | 21464907 | 58216 | 553 | 4269 | 25757972 | 25753703 | 46565 | 922 | 7115 | 33448357 | 33441242 | 36279 |
| Sichuan | 267 | 2058 | 23833665 | 23831606 | 89370 | 400 | 3088 | 28620238 | 28617150 | 71544 | 667 | 5146 | 36779002 | 36773856 | 55162 |