Costs predicted by the NIRUDAK and DHAKA models were compared to costs predicted by the WHO algorithm. Actual costs from the NIRUDAK and DHAKA prospective cohort studies are presented for reference.

Using the NIRUDAK model, patients had a median projected total cost of $5.18 (IQR: 0 - 25.56), while median projected total costs using the WHO guidelines were $5.23 (IQR: 5.09 - 22.17). Actual total cost of care was $37.75 (IQR: 15.69 - 45.00) (Figure 1 & Table 1). When isolating costs for initial fluid resuscitation, the median projected cost per patient was $3.27 (IQR: 0 - 4.27) using the NIRUDAK model and $4.55 (IQR: 0 - 5.76) using the WHO guidelines, while actual costs of care were $5.43 (IQR: 4.16 - 5.43) (Figure 1 & Table 2).

Due to limitations in available data, the only comparison that could be done in the pediatric population was of total fluid costs. These costs were markedly lower than in the older population: the DHAKA model predicted a median cost of fluid per patient of $0.02 (IQR: 0 - 0.97) as compared to the $0.04 (IQR: 0.03 - 1.24) predicted by the WHO algorithm (Figure 2 & Table 3).

Measuring the societal cost savings (e.g., of hospital beds, physician and nurse labor, transportation to healthcare facilities, etc.) is beyond the scope of this analysis. However, by more accurately diagnosing patient dehydration levels — thus freeing up hospital beds and resources for the most severely ill patients and saving moderately ill patients the costs of in-patient care — the NIRUDAK and DHAKA models also provide positive externalities that are unable to be captured here.

Figure 1. Summary of cost comparisons — NIRUDAK model

Table 1. Total cost of initial recommended resuscitation — NIRUDAK model

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Actual Median | WHO Median | NIRUDAK Median | actual IQR | WHO IQR | NIRUDAK IQR | actual Total | WHO Total | NIRUDAK Total | actual  Obser-vations | WHO Obser-vations | NIRUDAK Obser-vations |
| All Patients | 37.75 (3222) | 5.23 (449) | 5.18 (445) | 15.69 -45.00  (1332 - 3841) | 5.09 - 22.17 (437 - 1883) | 0 - 25.46 (0 - 2166) | 68684 (5854650) | 28458 (2425359) | 30515 (2602843) | 2168 | 2168 | 2136 |
| No  Dehyd-ration | 37.39 (3200) | 0 (0) | 0 (0) | 12.26 - 44.99  (1052 - 3842) | 0 - 0  (0 - 0) | 0 - 0  (0 - 0) | 13122 (1120904) | 0 (0) | 0 (0) | 430 | 491 | 606 |
| Some  Dehyd-ration | 37.77 (3231) | 5.21 (448) | 5.16 (443) | 16.17 - 44.93 (1369 - 3836) | 5.18 - 5.24  (445 - 451) | 5.14 - 5.18  (441 - 446) | 45746 (3897372) | 4861 (417865) | 3208 (275687) | 1435 | 933 | 622 |
| Severe  Dehyd-ration | 39.14 (3331) | 30.31 (2579) | 28.22 (2405) | 18.99 - 45.48  (1611 - 3860) | 21.45 - 38.27  (1820 - 3259) | 20.01 - 36.50 (1704 - 3109) | 9298 (791346) | 23598 (2007496) | 27306 (2327156) | 278 | 744 | 908 |

Actual costs are the sum of the costs of the actual amount of fluid administered plus the actual cost of hospital stay in the NIRUDAK study. Costs are set to zero for patients classified as having No Dehydration by the WHO or models, as both models recommend that these patients be managed expectantly. For patients classified as experiencing Some Dehydration by either model, costs equal four hours of hospital stay (for observation) plus the amount of fluid needed for resuscitation as predicted by the model. For patients a with Severe Dehydration classification, costs equal the actual length of hospital stay in the NIRUDAK prospective cohort study, plus the amount of fluid needed for resuscitation as predicted by either model, plus the actual amount of fluid in the given in the NIRUDAK prospective cohort study after 6 hours of admission to the hospital. Observations missing diagnostic labels for a particular model were omitted in analysis for that model. Costs outside parentheses are in USD; costs within parentheses are in BDT.

Table 2. Cost of fluid needed for initial recommended resuscitation — NIRUDAK model

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ACTUAL Median | WHO Median | NIRUDAK Median | ACTUAL IQR | WHO IQR | NIRUDAK IQR | ACTUAL Total | WHO Total | NIRUDAK Total | ACTUAL Obser-vations | WHO Obser-vations | NIRUDAK Obser-vations |
| All Patients | 5.43 (449) | 4.55 (375) | 3.27 (3217) | 4.16 - 5.43 (345 - 553) | 0 -5.76 (0 - 476) | 0 - 4.27  (0 - 354) | 10625 (880330) | 8574 (708647) | 5850 (483949) | 2173 | 2172 | 2139 |
| No  Dehyd-ration | 2.96 (245) | 0 (0) | 0 (0) | 1.06 -4.80  (89 - 398) | 0 - 0 (0 - 0) | 0 - 0  (0 - 0) | 1397 (115975) | 0 (0) | 0 (0) | 431 | 491 | 607 |
| Some  Dehyd-ration | 5.44 (451) | 4.45 (367) | 3.34 (276) | 4.18 - 6.68 (347 - 553) | 3.81 - 5.12 (314 - 423) | 2.84 - 3.85  (235 - 318) | 7492 (620577) | 4125 (340489) | 2072 (171002) | 1437 | 937 | 624 |
| Severe  Dehyd-ration | 5.64 (468) | 6.04 (500) | 4.30 (356) | 5.42 -6.75 (449 - 559) | 5.16 -6.81 (427 - 563) | 3.54 - 4.92 (293 - 407) | 1668 (138098) | 4449 (368158) | 3778 (312946) | 278 | 744 | 908 |

Actual costs are the sum of the costs of ORS administered in the first six hours after admission (if applicable), plus IVF administered in the first six hours after admission and associated intravenous (IV) equipment (if applicable). For patients classified as having No Dehydration by the WHO or NIRUDAK model, costs were set to zero as both models recommend that these patients be managed expectantly. For patients with a classification of Some Dehydration, costs equal the cost of ORS needed for initial resuscitation as predicted by either model. Patients classified as having Severe Dehydration were assigned costs equal to the amount of IVF needed for resuscitation (as predicted by the model), plus associated IV equipment. Observations missing diagnostic labels for a particular model were omitted in analysis for that model. Costs outside parentheses are in USD; costs within parentheses are in BDT.

Figure 2. Total cost of fluid — DHAKA model

Table 3. Total cost of fluid — DHAKA model

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ACTUAL Median | WHO Median | DHAKA Median | ACTUAL IQR | WHO IQR | DHAKA IQR | ACTUAL Total | WHO Total | DHAKA Total | ACTUAL Obser-vations | WHO Obser-vations | DHAKA Obser-vations |
| All Patients | 0.51 (44) | 0.04 (4) | 0.02 (2) | 0.45 - 1.71  (39 - 146) | 0.03 - 1.24  (3 - 105) | 0 - 0.97  (0 - 83) | 885 (74499) | 421 (35669) | 432 (36912) | 820 | 849 | 847 |
| No  Dehyd-ration | 0.46 (39) | 0 (0) | 0 (0) | 0.45 - 0.50  (39 - 43) | 0 - 0  (0 - 0) | 0 - 0  (0 - 0) | 226 (19339) | 0 (0) | 0 (0) | 349 | 91 | 267 |
| Some  Dehyd-ration | 1.10 (93) | 0.03 (3) | 0.01 (1) | 0.47 - 1.73  (41 - 145) | 0.03 - 0.04  (3 - 4) | 0.01 - 0.02  (1 - 2) | 447 (37551) | 18.08 (1627) | 2.67 (240) | 341 | 496 | 176 |
| Severe  Dehyd-ration | 1.73 (145) | 1.55 (131) | 0.98 (84) | 1.10 - 2.37  (93 - 198) | 1.30 - 1.73 (110 - 146) | 0.80 - 1.24  (69 - 106) | 162 (13536) | 403 (34042) | 429 (36672) | 83 | 262 | 404 |

Actual costs are the sum of the costs of all ORS administered during the hospital stay (if applicable), plus all IVF administered during the hospital stay and associated IV equipment (if applicable). For patients classified as having No Dehydration by the WHO or DHAKA model, costs were set to zero as both models recommend that these patients be managed expectantly. For patients with a classification of Some Dehydration, costs equal the cost of ORS needed for initial resuscitation as predicted by either model. Patients classified as having Severe Dehydration were assigned costs equal to the amount of IVF needed for resuscitation (as predicted by the model), plus associated IV equipment. Observations missing diagnostic labels for a particular model were omitted in analysis for that model. Costs outside parentheses are in USD; costs within parentheses are in BDT.