J Glob Health 2018; 8:0 010807

Appendix S1

Geographic proximity was calculated using ArcGIS 10.1. The longitude and latitude of the location of households with sick children and healthcare providers were input as XY data in decimal degrees and converted to point features by applying a geographic coordinate system (WGS 1984). Location data were converted to a geodatabase with a planar system (2-dimensional Cartesian plane) by projecting the data frame to the appropriate planar coordinate system for Zambia (universal transverse Mercator (UTM) zone 35S). Separate shape files were generated for each category of provider. These features were used in calculating geographic proximity:

<u>Nearest Absolute Distance</u>: A household with a sick child was linked to the closest provider within the reported category of source of care using the Near Features tool. Household location was used as the input feature and the provider location (by category) was the near feature. The procedure generated a variable in the household attribute table of the ID for the closest provider by absolute distance. This procedures was repeated with each of the 7 categories of providers and the household locations of children that sought care from those provider categories.

Nearest Travel Distance: A household with sick child was linked to the closest provider by road using the Closest Facility Analysis tool within the Network Analyst suite. Road network information for the study area was imported from Open Street Maps (OSM). As only roads were included in the OSM file, large trails and dirt paths were manually added to the road network based on satelite imagery. Provider locations (by category) were classified as "facilities" and households were defined as "incidents." The analysis tool calculated the fastest route from each incident (household) to a facility (provider) along the road network. Distance from the household to the closest road was treated as zero. The analysis accounted for the quality of the road on potential routes to providers. The hierarchy attribute was used to weight preference for better quality roads - mimicking the effect of faster travel times and greater availability of vehicular transportation. Paved roads were given preference over graded dirt roads, and graded dirt roads were given preference over ungraded roads and walking trails. No additional barriers or restrictions were used, other than existing breaks in the road network. Time was defined as the cost attribute for the impedence, resulting in calculation of the route with the minimal time from houshold to provider. Data on the starting household and closest provider by road was stored in the Route attribute table. This procedure was repeated with each of the 7 categories of providers and the household locations of children that sought care from those provider categories.

<u>Radius (5 Kilometer)</u>: A household with a sick child was linked to all providers within the source of care category within a 5 km radius of the child's home using the Buffer and Interect tool. The planar method was used to generate a Euclidean buffer around each household with a straight-line radius of 5 km. Household locations were used as the input feature with a buffer distance of 5 km. The Intersect tool was used to compute the geometric intersection of the resulting household buffer layer and the locations of providers. The household buffer polygon feature and the provider location point feature were used as the inputs. The resulting output feature attribute table identified all providers falling within the 5 km radius (intersecting the buffer) of each household. This procedure was repeated with each of the 7

categories of providers and the household locations of children that sought care from those provider categories.

<u>KDE:</u> A household with a sick child was linked to provider(s) exerting the strongest pull over distance weighted by structural quality score and provider category using the Kernel Density tool within the Spatial Analyst suite. KDE parameters were adapted from those employed by Skiles [21]. Kernel size was defined by provider category with higher-order facilities receiving a larger kernel size:

- Hospitals: 10 km radius
- Government health centers and private clinics : 5 km radius
- Government CBAs and pharmacies: 2 km radius
- Traditional practitioners and informal shops: 1 km radius

The location of providers (by category) was used as the input feature. The provider structural quality score was specified as the "population," or density, value. The search radius, or kernel size, varied by the provider category as specified above. The procedure generated an output raster with a cell size of 500 m. The "Extract values to points" function was then used to calculate the raster value at the point location of each household. The household attribute table then contained the weighted pull value exerted by the category of provider at the location of the household. This procedure was repeated with each of the 7 categories of providers and the household locations of children that sought care from those provider categories. Two methods were used to assign a child a structural quality score based on the "pull" values generated through the KDE:

- Each child was linked to the closest provider within the source of care category exerting the strongest pull.
- Each child was linked to the closest provider within all categories of source of care exerting any pull on the household. The structural quality score assigned to each child was weighted based on the level of draw exerted by the category of provider.

Relevant attribute tables for proximity measures generated in ArcGIS were exported as CSV files. The CSV was converted to a Stata data set and merged with the child illness household survey data set for analysis in Stata. Two additional measures of geographic proximity were generated in Stata 14.2:

<u>Administrative Unit (HFCA):</u> Each sick child was assigned the average structural quality score of all providers within the source of care category within the HFCA in which the household resides. The average structural quality score for all providers within a category in each HFCA was calculated. Each provider was assigned to an HFCA based on their location within facility catchment boundaries. This average score was then linked to each sick child based on the HFCA of the household location and the reported category of source of care (e.g. a sick child in Mochipapa HFCA treated by a CBA was assigned an average structural quality score of all CBAs within Mochipapa HFCA).

<u>Administrative Unit (Study Area)</u>: Each sick child was assigned the average structural quality score of all providers within the source of care category within the total study area. The average structural quality score for all providers within a category was calculated. This average score was then linked to each sick child based on the reported category of source of care (e.g. a sick child in Mochipapa HFCA treated by a CBA was assigned an average structural quality score of all CBAs within the total study area).

| | | Rural | | | Urban | |
|--|-----|-------|-------------|-----|-------|-------------|
| | n | % | CI | n | % | CI |
| Child Age (in years) | 547 | | | 537 | | |
| 0 | 102 | 18.6 | [15.6-22.1] | 102 | 19 | [15.9-22.5] |
| 1 | 115 | 21 | [17.8-24.6] | 121 | 22.5 | [19.2-26.3] |
| 2 | 115 | 21 | [17.8-24.6] | 107 | 19.9 | [16.8-23.5] |
| 3 | 109 | 19.9 | [16.8-23.5] | 100 | 18.6 | [15.5-22.1] |
| 4 | 106 | 19.4 | [16.3-22.9] | 107 | 19.9 | [16.8-23.5] |
| | | | | | | |
| Child Sex | 547 | | | 537 | | |
| Female | 274 | 50.1 | [45.9-54.3] | 277 | 51.6 | [47.3-55.8] |
| Male | 273 | 49.9 | [45.7-54.1] | 260 | 48.4 | [44.2-52.7] |
| | | | | | | |
| Maternal Age (in years) | 387 | | | 451 | | |
| 15-19 | 47 | 12.1 | [9.2-15.8] | 51 | 11.3 | [8.7-14.6] |
| 20-29 | 155 | 40.1 | [35.3-45.0] | 253 | 56.1 | [51.5-60.6] |
| | 126 | 32.6 | [28.1-37.4] | 127 | 28.2 | [24.2-32.5] |
| 40-49 | 59 | 15.2 | [12.0-19.2] | 20 | 4.4 | [2.9-6.8] |
| | | | | | | |
| Maternal Education | 387 | | | 451 | | |
| No education or primary incomplete | 97 | 25.1 | [21.0-29.6] | 82 | 18.2 | [14.9-22.0] |
| Primary complete | 118 | 30.5 | [26.1-35.3] | 69 | 15.3 | [12.3-18.9] |
| Secondary incomplete | 138 | 35.7 | [31.0-40.6] | 171 | 37.9 | [33.5-42.5] |
| Secondary complete or higher | 34 | 8.8 | [6.3-12.1] | 129 | 28.6 | [24.6-33.0] |
| Providers participating in preparedness assessment | 54 | | | 29 | | |
| Govt hospital | 0 | | | 1 | | |
| Govt health center/ post | 5 | | | 2 | | |
| Govt CBA / fieldworker | 19 | | | 9 | | |
| Pvt hospital / clinic | 0 | | | 5 | | |
| Pharmacy | 0 | | | 6 | | |
| Shop / market | 1 | | | 3 | | |
| Traditional / faith-based practitioner | 29 | | | 3 | | |

Supplementary Table 1. Characteristics of participating children, mothers, households and healthcare providers, by stratum

Supplemental Table 2. Median structural quality domain scores by provider category (each category score out of one by provider)

| Provider Category | Sample Size | Di | agnostics | Basic | Medicines | Comp | Severe / licated Illness ⁄ledicines | Huma | In Resources | Ma C | nagement Capacity | Kı | nowledge | Struct | tural Quality Score |
|---|----------------|------|-------------|-------|------------|------|---|------|--------------|---------|----------------------|------|-------------|--------|------------------------|
| | | % | (IQR) | % | (IQR) | % | (IQR) | % | (IQR) | % | (IQR) | % | (IQR) | % | (IQR) |
| Govt hospital / health center / post | 8 | 100 | (83.3-100) | 87.5 | (75-100) | 83.3 | (66.7-100) | 66.7 | (33.3-66.7) | 100 | (100-100) | 51.7 | (47.1-64.3) | 81.5 | (74.8-86.6) |
| Govt CBA / fieldworker | 28 | 100 | (50-100) | 66.7 | (33.3-100) | - | - | 66.7 | (33.3-66.7) | 40 | (20-40) | 100 | (100-100) | 70.7 | (57.7-71.3) |
| Pvt hospital / clinic | 5 | 80 | (66.7-83.3) | 100 | (75-100) | 66.7 | (66.7-66.7) | 33.3 | (33.3-33.3) | 100 | (100-100) | 54.3 | (45.8-56.8) | 68.7 | (58.4-75.7) |
| Pharmacy | 6 | 33.3 | (0-50) | 100 | (75-100) | 66.7 | (33.3-66.7) | 33.3 | (0-66.7) | 20 | (0-60) | 0 | (0-78.6) | 43.8 | (33.3-61.3) |
| Shop / market | 4 | - | - | - | - | - | - | - | - | 0 | (0-0) | 0 | (0-0) | 0 | (0-0) |
| Traditional / faith-based | 32 | 16.7 | (0-50) | 0 | (0-0) | - | - | 0 | (0-0) | 20 | (0-20) | 25 | (0-50) | 16.7 | (5-28) |

*Presented using collapsed provider categories to preserve confidentiality of providers. Categories defined in Box1 1 used in all linking analyses restricted by source of care provider category.

| | | | | | | HFCA | | | | | | Str | ata | | | Overall |
|---------------------------------------|--------|---------------|---|--------------|----|--------------|---|--------------|---|--------------|----|--------------|-----|--------------|----|--------------|
| Provider Category | | RURAL A | | RURAL B | | RURAL C | | URBAN A | | URBAN B | | Rural | | Urban | | |
| | n | Quartile COD | n | Quartile COD | n | Quartile COD | n | Quartile COD | n | Quartile COD | n | Quartile COD | n | Quartile COD | n | Quartile COD |
| Hospital | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 1 | 0 | 1 | 0 |
| Govt health center / post | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 5 | 0.09 | 2 | 0.01 | 7 | 0.09 |
| Govt CBA / fieldworker | 7 | 0.11 | 7 | 0.16 | 5 | 0.21 | 4 | 0.06 | 5 | 0.07 | 19 | 0.12 | 9 | 0.06 | 28 | 0.11 |
| Pvt hospital / clinic | 0 | - | 0 | - | 0 | - | 2 | 0.09 | 3 | 0.29 | 0 | - | 5 | 0.13 | 5 | 0.13 |
| Pharmacy | 0 | - | 0 | - | 0 | - | 1 | 0 | 5 | 0.29 | 0 | - | 6 | 0.29 | 6 | 0.30 |
| Shop / market | 0 | - | 0 | - | 1 | - | 3 | 0 | 0 | - | 1 | 0 | 3 | 0 | 4 | 0 |
| Traditional / faith-based | 10 | 0.38 | 8 | 0.30 | 11 | 0.46 | 2 | 1 | 1 | 0 | 29 | 0.70 | 3 | 1 | 32 | 0.70 |
| ANOVA Test | | | | | | | | | | | | | | | | |
| Mean Square Betweer Group Variance | ן פ | 0.779 | | 0.285 | | 0.342 | | 0.234 | | 0.104 | | 1.156 | | 0.273 | | 0.89 |
| Mean Square Withir Group Variance | ו פ | 0.008 | | 0.018 | | 0.015 | | 0.035 | | 0.051 | | 0.015 | | 0.041 | | 0.2 |
| F statistic, p |) 9 | 96.02, <0.001 | 1 | 6.05, <0.001 | 21 | 42, <0.001 | (| 6.60, 0.014 | | 2.03, ns | 7 | 3.18, <0.001 | | 6.71, <0.001 | 40 | 0.28, <0.001 |

Supplemental Table 3. Variability of structural quality scores within provider category by HFCA, strata, and overall assessed as quartile coefficient of dispersion and ANOVA test of within versus between provider category variance

Supplemental Table 4. Proportion of care-seeking events linked to original source of care by single-link method by provider category and stratum

| All Providers | | | | | | |
|-------------------------------|------------|----------|----------------------|------------|----------|----------------------|
| Nearest Absolute Distance | | Rural | | | Urban | |
| | # Original | # Linked | % Linked Original | # Original | # Linked | % Linked Original |
| Govt hospital | 0 | - | - | 5 | 5 | 100 |
| Govt health center / post | 122 | 111 | 91.0% | 111 | 100 | 90.1 |
| Govt CBA / fieldworker | 36 | 29 | 80.6 | 0* | - | - |
| Pvt hospital / clinic | 0 | - | - | 1 | 0 | 0 |
| Pharmacy | 0* | - | - | 2 | 1 | 50 |
| Shop / market | 2 | 2 | 100 | 1* | 0 | 0 |
| Traditional / faith-based | 4* | 4 | 100 | 0 | - | - |
| All Sources of Care | 164 | 146 | 89.0% | 120 | 106 | 88.3% |
| Nearest Road Distance | | Rural | | | Urban | |
| | # Original | # Linked | % Linked Original | # Original | # Linked | % Linked Original |
| Govt hospital | 0 | - | - | 5 | 5 | 100 |
| Govt health center / post | 122 | 100 | 82.0% | 111 | 86 | 77.5 |
| Govt CBA / fieldworker | 36 | 24 | 66.7 | 0* | - | - |
| Pvt hospital / clinic | 0 | - | - | 1 | 0 | 0 |
| Pharmacy | 0* | - | - | 2 | 0 | 0 |
| Shop / market | 2 | 2 | 100 | 1* | 1 | 100 |
| Traditional / faith-based | 4* | 2 | 50 | 0 | - | - |
| All Sources of Care | 164 | 128 | 78.0% | 120 | 92 | 76.7% |
| Facility-Based Providers Only | | | | | | |
| Nearest Absolute Distance | | Rural | | | Urban | |
| | # Original | # Linked | % Linked Original | # Original | # Linked | % Linked Original |
| Govt hospital | 0 | - | - | 5 | 5 | 100 |
| Govt health center / post | 122 | 111 | 91.0% | 111 | 100 | 90.1 |
| Govt CBA / fieldworker | 36 | 0 | 0 | 0* | - | - |
| Pvt hospital / clinic | 0 | - | - | 1 | 0 | 0 |
| Pharmacy | 0* | - | - | 2 | 0 | 0 |
| Shop / market | 2 | 0 | 0 | 1* | 0 | 0 |
| Traditional / faith-based | 4* | 0 | 0 | 0 | - | - |
| All Sources of Care | 164 | 111 | 67.7% | 120 | 106 | 88.3% |
| Nearest Road Distance | | Rural | | | Urban | |
| | # Original | # Linked | % Linked Original | # Original | # Linked | % Linked Original |
| | - | | 0 | + _ | _ | |

| Govt hospital | 0 | - | - | 5 | 5 | 100 |
|---------------------------|-----|-----|-------|-----|----|-------|
| Govt health center / post | 122 | 100 | 82.0% | 111 | 86 | 77.5 |
| Govt CBA / fieldworker | 36 | 0 | 0 | 0* | - | - |
| Pvt hospital / clinic | 0 | - | - | 1 | 0 | 0 |
| Pharmacy | 0* | - | - | 2 | 0 | 0 |
| Shop / market | 2 | 0 | 0 | 1* | 0 | 0 |
| Traditional / faith-based | 4* | 0 | 0 | 0 | - | - |
| All Sources of Care | 164 | 100 | 61.0% | 120 | 91 | 75.8% |

Supplemental Table 5. Proportion of children that were linked to any provider, by provider category and stratum

| All Providers | | | | | | |
|---------------------------|------------|-----------|-----------|------------|-----------|-----------|
| Radius - 5 km | | Rural | | | Urban | |
| | # Original | # Matched | % Matched | # Original | # Matched | % Matched |
| Govt hospital | 0 | - | - | 5 | 5 | 100% |
| Govt health center / post | 122 | 65 | 53% | 111 | 111 | 100% |
| Govt CBA / fieldworker | 36 | 36 | 100% | 1 | 1 | 100% |
| Pvt hospital / clinic | 0 | - | - | 1 | 1 | 100% |
| Pharmacy | 1 | 0 | 0% | 2 | 2 | 100% |
| Shop / market | 2 | 2 | 100% | 9 | 9 | 100% |
| Traditional / faith-based | 5 | 3 | 60.0% | 0 | - | - |
| All Sources of Care | 166 | 106 | 63.8% | 129 | 129 | 100% |
| Administrative Unit - | | Rural | | | Urban | |
| HFCA | # Original | # Matched | % Matched | # Original | # Matched | % Matched |
| Govt hospital | 0 | - | | 5 | 5 | 100% |
| Govt health center / post | 122 | 122 | 100% | 111 | 111 | 100% |
| Govt CBA / fieldworker | 36 | 36 | 100% | 1 | 1 | 100% |
| Pvt hospital / clinic | 0 | - | | 1 | 1 | 100% |
| Pharmacy | 1 | 0 | 0% | 2 | 2 | 100% |
| Shop / market | 2 | 2 | 100% | 9 | 9 | 100% |
| Traditional / faith-based | 5 | 5 | 100% | 0 | - | - |
| All Sources of Care | 166 | 165 | 99.4% | 129 | 129 | 100% |
| Administrative Unit - | | Rural | | | Urban | |
| Total Area | # Original | # Matched | % Matched | # Original | # Matched | % Matched |
| Govt hospital | 0 | - | | 5 | 5 | 100% |
| Govt health center / post | 122 | 122 | 100% | 111 | 111 | 100% |
| Govt CBA / fieldworker | 36 | 36 | 100% | 1 | 1 | 100% |
| Pvt hospital / clinic | 0 | - | | 1 | 1 | 100% |
| Pharmacy | 1 | 1 | 0% | 2 | 2 | 100% |
| Shop / market | 2 | 2 | 100% | 9 | 9 | 100% |
| Traditional / faith-based | 5 | 5 | 100% | 0 | - | - |
| All Sources of Care | 166 | 165 | 99.4% | 129 | 129 | 100% |
| | | | | | | |

Facility-Based Providers Only

| Radius - 5 km | | Rural | | | Urban | |
|---------------------------|------------|-----------|-----------|------------|-----------|-----------|
| | # Original | # Matched | % Matched | # Original | # Matched | % Matched |
| Govt hospital | 0 | - | - | 5 | 5 | 100% |
| Govt health center / post | 122 | 65 | 53% | 111 | 111 | 100% |
| Govt CBA / fieldworker | 36 | 0 | 0% | 1 | 0 | 0% |
| Pvt hospital / clinic | 0 | - | - | 1 | 1 | 100% |
| Pharmacy | 1 | 0 | 0% | 2 | 0 | 0% |
| Shop / market | 2 | 0 | 0% | 9 | 0 | 0% |
| Traditional / faith-based | 5 | 0 | 0% | 0 | - | - |
| All Sources of Care | 166 | 65 | 39% | 129 | 117 | 91% |
| Administrative Unit - | | Rural | | | Urban | |
| HFCA | # Original | # Matched | % Matched | # Original | # Matched | % Matched |
| Govt hospital | 0 | - | | 5 | 5 | 100% |
| Govt health center / post | 122 | 122 | 100% | 111 | 111 | 100% |
| Govt CBA / fieldworker | 36 | 0 | 0% | 1 | 0 | 0% |
| Pvt hospital / clinic | 0 | - | | 1 | 1 | 100% |
| Pharmacy | 1 | 0 | 0% | 2 | 0 | 0% |
| Shop / market | 2 | 0 | 0% | 9 | 0 | 0% |
| Traditional / faith-based | 5 | 0 | 0% | 0 | - | - |
| All Sources of Care | 166 | 122 | 73.5% | 129 | 117 | 91% |
| Administrative Unit - | | Rural | | | Urban | |

| Total Area | # Original | # Matched | % Matched | # Original | # Matched | % Matched |
|---------------------------|------------|-----------|-----------|------------|-----------|-----------|
| Govt hospital | 0 | - | | 5 | 5 | 100% |
| Govt health center / post | 122 | 122 | 100% | 111 | 111 | 100% |
| Govt CBA / fieldworker | 36 | 0 | 0% | 1 | 0 | 0% |
| Pvt hospital / clinic | 0 | - | | 1 | 1 | 100% |
| Pharmacy | 1 | 0 | 0% | 2 | 0 | 0% |
| Shop / market | 2 | 0 | 0% | 9 | 0 | 0% |
| Traditional / faith-based | 5 | 0 | 0% | 0 | - | - |
| All Sources of Care | 166 | 122 | 73.5% | 129 | 117 | 91% |

| | | In a second state to a second state of | f l- | |
|----------------------|-------------------------|--|-------------------|---------------------|
| Ninniomontal Lanio 6 | LIISTANCO TRAVOLOG TROM | nome to renorted | COULTED OT COTE D | v nrovider category |
| | | nome to reported | Jource of care b | y provider category |
| | | | | / |

| Provider category | | # Linked | Mean | SD | Min | Max |
|----------------------------|-------|----------|------|------|------|--------|
| Govt hospital | | 5 | 2.80 | 0.31 | 2.36 | 3.21 |
| Court hoalth contor (nact | Urban | 113 | 1.63 | 2.42 | 0.10 | 19.04* |
| Govt health center / post | Rural | 120 | 5.41 | 3.81 | 0.32 | 16.13 |
| | Urban | 0 | - | - | - | - |
| Govt CBA / fieldworker | Rural | 36 | 2.04 | 1.34 | 0.01 | 5.37 |
| Pvt hospital / clinic | | 1 | 4.39 | - | 4.39 | 4.39 |
| Pharmacy | | 2 | 1.84 | 0.25 | 1.67 | 2.02 |
| Chang / manufact | Urban | 1 | 1.93 | - | 1.93 | 1.93 |
| Shop / market | Rural | 2 | 2.90 | 1.64 | 1.73 | 4.07 |
| Traditional / faith-based | Urban | 0 | - | - | - | - |
| practitioner | Rural | 4 | 3.05 | 3.48 | 0.03 | 6.07 |

*2 rural children sought care from an urban facility

Supplemental Table 7. Average number of provider links among children that linked to source of care using geolinking method, by provider category and stratum

| Radius - 5 km | Ru | iral | Ur | ban |
|---------------------------|--------------|--------------|-------------|-------------|
| | Mean | [Range] | Mean | [Range] |
| Govt hospital | - | - | 1 | [1-1] |
| Govt health center / post | 1 | [1-1] | 2 | [2-2] |
| Govt CBA / fieldworker | 2.03 | [1-4] | 5 | [5-5] |
| Pvt hospital / clinic | - | - | 5 | [5-5] |
| Pharmacy | - | - | 6 | [6-6] |
| Shop / market | 1 | [1-1] | 3 | [3-3] |
| Traditional / faith-based | 3.33 | [2-4] | - | - |
| All Sources of Care | 1.44 | [1-5] | 2.2 | [1-8] |
| Administrative Unit - | Ru | iral | Url | ban |
| HFCA | Mean | [Range] | Mean | [Range] |
| Govt hospital | - | - | 1 | [1-1] |
| Govt health center / post | 1 | [1-1] | 1 | [1-1] |
| Govt CBA / fieldworker | 6.11 | [5-7] | 4 | [4-4] |
| Pvt hospital / clinic | - | - | 2 | [2-2] |
| Pharmacy | - | - | 5 | [5-5] |
| Shop / market | 1 | [1-1] | 3 | [3-3] |
| Traditional / faith-based | 9.8 | [8-11] | - | - |
| All Sources of Care | 2.51 | 2.51 [1-11] | 1.28 | 1.28 [1-6] |
| Administrative Unit - | Ru | Iral | Url | ban |
| Total Area | Mean | [Range] | Mean | [Range] |
| Govt hospital | - | - | 1 | [1-1] |
| Govt health center / post | 7 | [7-7] | 7 | [7-7] |
| Govt CBA / fieldworker | 28 | [28-28] | 28 | [28-28] |
| Pvt hospital / clinic | - | - | 5 | [5-5] |
| Pharmacy | 6 | [6-6] | 6 | [6-6] |
| Shop / market | 4 | [4-4] | 4 | [4-4] |
| Traditional / faith-based | 32 | [32-32] | - | - |
| All Sources of Care | 12.97 [4-39] | 12.97 [4-39] | 6.96 [1-28] | 6.96 [1-28] |

Supplemental Table 8. Source of care by provider category, modeled through KDE single link and KDE weighted link methods, by provider category and stratum

| All Providers | | | | |
|--|---|--|---|--|
| KDE - Single Link | | Rural | ι | Jrban |
| | # linked | % children linked | # linked | % children linked |
| | 199 | | 186 | |
| Govt hospital | 0 | 0% | 34 | 18.3% |
| Govt health center / post | 74 | 37.2% | 0 | 0% |
| Govt CBA / fieldworker | 65 | 32.7% | 66 | 35.5% |
| Pvt hospital / clinic | 0 | 0% | 57 | 30.6% |
| Pharmacy | 0 | 0% | 29 | 15.6% |
| Shop / market | 0 | 0% | 0 | 0% |
| Traditional / faith-based | 20 | 10.1% | 0 | 0% |
| No Source | 40 | 20.1% | 0 | 0% |
| KDE - Weighted Link | | Rural | ι | Jrban |
| | | | | |
| | # linked | % children linked | # linked | % children linked |
| | # linked 199 | % children linked | # linked 186 | % children linked |
| Govt hospital | # linked 199 6 | % children linked | # linked 186 186 | % children linked 100% |
| Govt hospital Govt health center / post | # linked 199 6 92 | % children linked 3% 46.2% | # linked 186 186 186 | % children linked 100% 100% |
| Govt hospital Govt health center / post Govt CBA / fieldworker | # linked 199 6 92 69 | % children linked 3% 46.2% 34.7% | # linked 186 186 186 186 121 | % children linked 100% 100% 65.1% |
| Govt hospital Govt health center / post Govt CBA / fieldworker Pvt hospital / clinic | # linked 199 6 92 69 0 | % children linked 3% 46.2% 34.7% 0% | # linked 186 186 186 121 186 | % children linked 100% 100% 65.1% 100% |
| Govt hospital Govt health center / post Govt CBA / fieldworker Pvt hospital / clinic Pharmacy | # linked 199 6 92 69 0 0 | % children linked 3% 46.2% 34.7% 0% 0% | # linked 186 186 186 121 186 150 | % children linked 100% 65.1% 100% 80.6% |
| Govt hospital Govt health center / post Govt CBA / fieldworker Pvt hospital / clinic Pharmacy Shop / market | # linked 199 6 92 69 0 0 0 0 0 0 | % children linked 3% 46.2% 34.7% 0% 0% 0% 0% | # linked 186 186 186 121 186 150 0 | % children linked 100% 65.1% 100% 80.6% 0% |
| Govt hospital Govt health center / post Govt CBA / fieldworker Pvt hospital / clinic Pharmacy Shop / market Traditional / faith-based | # linked 199 6 92 69 0 0 0 0 0 35 | % children linked 3% 46.2% 34.7% 0% 0% 0% 0% 17.6% | # linked 186 186 121 186 150 0 85 | % children linked 100% 65.1% 100% 80.6% 0% 45.7% |
| Govt hospital Govt health center / post Govt CBA / fieldworker Pvt hospital / clinic Pharmacy Shop / market Traditional / faith-based No Source | # linked 199 6 92 69 0 0 0 0 0 35 40 | % children linked 3% 46.2% 34.7% 0% 0% 0% 17.6% 20.1% | # linked 186 186 121 186 150 0 85 0 | % children linked 100% 65.1% 100% 80.6% 0% 45.7% 0% |

| Facility-Based Providers Only | | | | | | | |
|-------------------------------|----------|-------------------|----------|-------------------|--|--|--|
| KDE - Single Link | | Rural | Urban | | | | |
| | # linked | % children linked | # linked | % children linked | | | |
| | 199 | | 186 | | | | |
| Govt hospital | 3 | 1.5% | 34 | 18.3% | | | |
| Govt health center / post | 89 | 44.7% | 0 | 0% | | | |
| Govt CBA / fieldworker | 0 | 0% | 0 | 0% | | | |
| Pvt hospital / clinic | 0 | 0% | 152 | 81.7% | | | |
| Pharmacy | 0 | 0% | 0 | 0% | | | |
| Shop / market | 0 | 0% | 0 | 0% | | | |
| Traditional / faith-based | 0 | 0% | 0 | 0% | | | |
| No Source | 107 | 53.8% | 0 | 0% | | | |
| KDE - Weighted Link | | Rural | Urban | | | | |
| | # linked | % children linked | # linked | % children linked | | | |
| | 199 | | 186 | | | | |
| Govt hospital | 6 | 3% | 186 | 100% | | | |
| Govt health center / post | 92 | 46.2% | 186 | 100% | | | |
| Govt CBA / fieldworker | 0 | 0% | 0 | 0% | | | |
| Pvt hospital / clinic | 0 | 0% | 186 | 100% | | | |
| Pharmacy | 0 | 0% | 0 | 0% | | | |
| Shop / market | 0 | 0% | 0 | 0% | | | |
| Traditional / faith-based | 0 | 0% | 0 | 0% | | | |
| No Source | 107 | 53.8% | 0 | 0% | | | |

Supplemental Table 9. Effective coverage of management of child illness and difference in estimate from the exact-match all provider coverage, by linking method and stratum using primary and alternative assumptions for missing links

| A. All Providers | | | | | | | | | | |
|--------------------------------|-----------------|------|---------------|-------|------|------|---------------|------|------|--|
| Linking Method | Unlinked | | Rural | | | | Urban | | | |
| | care-seeking | | | | | | | | | |
| | event assigned: | % | [95% CI] | Diff | Sign | % | [95% CI] | Diff | Sign | |
| Exact-Match | | 60.3 | [55.6 - 65.1] | REF | | 49 | [43.6 - 54.5] | REF | | |
| Single Match | | | | | | | | | | |
| Nearest-Absolute Distance | Average | 61.1 | [56.3 - 65.9] | 0.8 | ns | 49.1 | [43.7 - 54.6] | 0.1 | ns | |
| | Zero | 61.1 | [56.3 - 65.9] | 0.8 | ns | 49.1 | [43.7 - 54.6] | 0.1 | ns | |
| Nearest-Road Distance | Average | 58.8 | [54.1 - 63.5] | -1.5 | ns | 48.7 | [43.2 - 54.1] | -0.3 | ns | |
| | Zero | 58.8 | [54.1 - 63.5] | -1.5 | ns | 48.7 | [43.2 - 54.1] | -0.3 | ns | |
| Aggregate Match | | | | | | | | | | |
| Radius-5 km | Average | 59.4 | [54.8 - 64.1] | -0.9 | ns | 49.2 | [43.7 - 54.7] | 0.2 | ns | |
| | Zero | 38.8 | [33.4 - 44.2] | -21.5 | *** | 49.2 | [43.7 - 54.7] | 0.2 | ns | |
| Administrative unit-HFCA | Average | 59.8 | [55.1 - 64.5] | -0.5 | ns | 49.1 | [43.6 - 54.6] | 0.1 | ns | |
| | Zero | 59.5 | [54.8 - 64.3] | -0.8 | ns | 49 | [43.6 - 54.5] | 0 | ns | |
| Administrative unit-Total Area | Average | 57.9 | [53.4 - 62.4] | -2.4 | ns | 49.4 | [43.9 - 54.9] | 0.4 | ns | |
| | Zero | 57.9 | [53.4 - 62.4] | -2.4 | ns | 49.4 | [43.9 - 54.9] | 0.4 | ns | |
| KDE | | | | | | | | | | |
| Single Highest | | 55 | [50.4 - 59.6] | -5.3 | * | 71.8 | [69.3 - 74.2] | 22.8 | *** | |
| Weighted Aggregate | | 54.9 | [50.4 - 59.5] | -5.4 | * | 74.3 | [73.2 - 75.5] | 25.3 | *** | |
| | | | | | | | | | | |

| B. Facility-Based Providers Only | | | | | | | | | | |
|----------------------------------|-----------------|--------------|-------|---------------|-------|-------|------|---------------|------|------|
| | Unlinked | Care-seeking | Rural | | | Urban | | | | |
| | care-seeking | with CBA | | | | | | | | |
| | event assigned: | linked to: | % | [95% CI] | Diff | Sign | % | [95% CI] | Diff | Sign |
| Exact-Match | Average | Govt HC | 62.1 | [57.1 - 67.0] | 1.8 | ns | 48.7 | [43.2 - 54.2] | -0.3 | ns |
| | Zero | No Source | 50.2 | [44.6 - 55.8] | -10.1 | *** | 48.4 | [42.8 - 53.9] | -0.6 | ns |
| Single Match | | | | | | | | | | |
| Nearest-Absolute Distance | Average | Govt HC | 62.6 | [57.6 - 67.6] | 2.3 | ns | 48.7 | [43.2 - 54.2] | -0.3 | ns |
| | Zero | No Source | 51.5 | [45.8 - 57.3] | -8.8 | ** | 48.9 | [43.4 - 54.4] | -0.1 | ns |
| Nearest-Road Distance | Average | Govt HC | 61 | [56.2 - 65.9] | 0.7 | ns | 48.6 | [43.1 - 54.0] | -0.4 | ns |
| | Zero | No Source | 49.9 | [44.3 - 55.4] | -10.4 | *** | 48.8 | [43.2 - 54.3] | -0.2 | ns |
| Aggregate Match | | | | | | | | | | |
| Radius-5 km | Average | Govt HC | 61.2 | [56.4 - 66.1] | 0.9 | ns | 48.9 | [43.4 - 54.5] | -0.1 | ns |
| | Zero | No Source | 27.3 | [21.8 - 32.7] | -33 | *** | 49.2 | [43.6 - 54.7] | 0.2 | ns |
| Administrative unit-HFCA | Average | Govt HC | 62.8 | [57.8 - 67.8] | 2.5 | ns | 48.8 | [43.3 - 54.3] | -0.2 | ns |
| | Zero | No Source | 51 | [45.3 - 56.7] | -9.3 | ** | 48.9 | [43.4 - 54.5] | -0.1 | ns |
| Administrative unit-Total Area | Average | Govt HC | 59.9 | [55.2 - 64.6] | -0.4 | ns | 49 | [43.5 - 54.6] | 0 | ns |
| | Zero | No Source | 48.7 | [43.3 - 54.1] | -11.6 | *** | 49.3 | [43.7 - 54.9] | 0.3 | ns |
| KDE | | | | | | | | | | |
| Single Highest | | | 38.6 | [32.8 - 44.4] | -21.7 | *** | 79 | [77.8 - 80.3] | 30 | *** |
| Weighted Aggregate | | | 38.6 | [32.8 - 44.4] | -21.7 | *** | 82.4 | [81.9 - 82.9] | 33.4 | *** |