

**Appendix 3 (as supplied by authors): Rates of triggers and adverse events (preventable and nonpreventable) by type of hospital, age group, degree of harm, responsible service and factors to which the adverse events were related**

| <b>Appendix 3A: Rates of Triggers, Adverse Events and Preventable Adverse Events overall by type of hospital and by age group by type of hospital</b> |                     |                 |                |                            |             |                        |                           |                          |                      |           |                        |                           |                          |      |         |
|---|---------------------|-----------------|----------------|----------------------------|-------------|------------------------|---------------------------|--------------------------|----------------------|-----------|------------------------|---------------------------|--------------------------|------|---------|
| Variable  | Patients, no. (%)   |                 |                |                            | RR (95% CI) | Patients, no. (%)      |                           |                          |                      | p value   | Patients, no. (%)      |                           |                          |      | p value |
|   | Type of Hospital    |                 |                | Academic Paediatric Centre |             |                        |                           | Community Hospital       |                      |           |                        |                           |                          |      |         |
|   | Overall<br>n = 3669 | APC<br>n = 1692 | CH<br>n = 1977 | 0-28 days<br>n = 425       |             | 29-365 days<br>n = 423 | 366 days-5 yrs<br>n = 419 | >5yrs-18 yrs.<br>n = 425 | 0-28 days<br>n = 502 |           | 29-365 days<br>n = 479 | 366 days-5 yrs<br>n = 481 | >5yrs-18 yrs.<br>n = 515 |      |         |
| Patients with ≥1 Trigger  | 1083 (29.5)         | 656 (38.8)      | 427 (21.6)     | 1.8 (1.6-2.0)              | 146 (34.4)  | 181 (42.8)             | 161 (38.4)                | 168 (39.5)               | 0.09                 | 86 (17.1) | 113 (23.6)             | 101 (21)                  | 127 (24.7)               | 0.02 |         |
| Patients with an Adverse Event  | 237 (6.5)           | 172 (10.2)      | 65 (3.3)       | 3.1 (2.3-4.1)              | 42 (9.9)    | 50 (11.8)              | 38 (9.1)                  | 42 (9.9)                 | 0.6                  | 11 (2.2)  | 12 (2.5)               | 16 (3.3)                  | 26 (5.1)                 | 0.05 |         |
| Patients with > 1 adverse event   | 30(0.8)             | 26(1.5)         | 4(0.2)         | 7.6 (2.5-25.6)             | 8(1.9)      | 9(2.1)                 | 3(0.7)                    | 6(1.4)                   | 0.4                  | 0         | 1(0.2)                 | 2(0.4)                    | 1(0.2)                   | 0.6  |         |
|   | n=237               | n=172           | n=65           |                            | n = 42      | n = 50                 | n = 38                    | n = 42                   |                      | n = 11    | n = 12                 | n = 16                    | n = 26                   |      |         |
| Patients with a Preventable Adverse Event*  | 106 (44.7)          | 66 (38.4)       | 40 (61.5)      | 0.6 (0.4-0.8)              | 18(42.9)    | 14(28.0)               | 14(36.8)                  | 20(47.6)                 | 0.2                  | 4 (36.4)  | 8(66.7)                | 10 (62.5)                 | 18 (69.2)                | 0.3  |         |
| Patients with a Non-Preventable Adverse Event   | 131 (55.3)          | 106 (61.6)      | 25 (38.5)      | 1.6 (1.2-2.3)              | 24 (57.1)   | 36 (72.0)              | 24 (63.2)                 | 22 (52.4)                | 0.2                  | 7 (63.6)  | 4 (33.3)               | 6 (37.5)                  | 8 (30.8)                 | 0.3  |         |

Note: APC= academic pediatric centre, CH=community hospital, NICU= neonatal intensive care unit, RR=relative risk, CI = confidence interval, NA = not applicable  
 Note: Relative risk is not available for age groups comparison; in their place, p values are provided.

\*The proportion of preventable adverse events was statistically higher in community hospitals than in academic pediatric centres in the 29d-365d age group.

**Appendix 3B: Weighted\* rates of adverse events(AEs), by hospital type; for neonates admitted or not to Neonatal ICU; and by medical or surgical case category in children over 28 days**

| Variable  | Patients, no. (%)    |                     |                      | RR (95% CI)<br>[p value] |
|---|----------------------|---------------------|----------------------|--------------------------|
|   | Overall<br>n = 3669  | Hospital Type       |                      |                          |
|   |                      | APC<br>n = 1692     | CH<br>n = 1977       |                          |
| Patients with an Adverse Event                            | 237 (6.5)            | 172 (10.2)          | 65 (3.3)             | 3.1 (2.3-4.1)            |
| Patients with a preventable adverse event                 | 106 (44.7)           | 66 (46.5)           | 40 (61.5)            | 0.6 (0.4-0.8)            |
| Weighted adverse event rate, % (and 95% CI) *             | 9.2 (5.1-13.3)       | 11.2 (6.4-15.9)     | 3.3 (1.2-5.3)        | [p<0.0001]               |
| Weighted preventable adverse event rate, % (and 95% CI) ‡ | 3.6 (1.5-5.7)        | 4.1 (1.2-7.0)       | 2.0 (0.001-4.0)      | [p=0.1]                  |
|   | Admission to NICU    |                     |                      |                          |
|   | Overall<br>n = 651   | No<br>n = 534       | Yes<br>n = 117       |                          |
| Age 0-28d   |                      |                     |                      |                          |
| Patients with an Adverse Event                            | 29 (4.5)             | 10 (1.9)            | 19 (16.2)            | 0.1 (0.1-0.3)            |
| Patients with a preventable adverse event                 | 11 (37.9)            | 4 (40.0)            | 7 (36.8)             | 1.1 (0.3-3.0)            |
| Weighted adverse event rate, % (and 95% CI) †             | 9.1(0-21.2)          | 1.5(0.1-2.9)        | 33.9(0.3-67.5)       | [p<0.0001]               |
| Weighted preventable adverse event rate, % (and 95% CI) ‡ | 2.7(0-6.8)           | 0.4(0-1.0)          | 10.2(0-23.5)         | [p<0.0001]               |
|   | Reason for Admission |                     |                      |                          |
|   | Overall<br>n = 3018  | Medical<br>n = 2004 | Surgical<br>n = 1014 |                          |
| Age 29d-18y   |                      |                     |                      |                          |
| Patients with an Adverse Event                            | 208 (6.9)            | 107 (5.3)           | 101 (10.0)           | 0.5 (0.4-0.7)            |
| Patients with a preventable adverse event                 | 95 (45.7)            | 49 (45.8)           | 46 (45.5)            | 1.0 (0.7-1.4)            |
| Weighted adverse event rate, % (and 95% CI)               | 7.3(5.0-9.6)         | 5.9(4.1-7.7)        | 10.1(4.6-15.5)       | [p=0.06]                 |
| Weighted preventable adverse event rate, % (and 95% CI) ‡ | 3.2(1.4-5.0)         | 2.3(0.9-3.7)        | 5.1(1.8-8.4)         | [p=0.005]                |

Note: APC= academic pediatric centre, CH=community hospital, NICU= neonatal intensive care unit, RR=relative risk, CI = confidence interval, NA = not available

Note: Relative risk is not available for age groups comparison; in their place, p values are provided.

\*Point estimates and CIs were weighted to account for the total number of charts per hospital and the total number of hospitals per type per province. Results were first weighted for the total number of charts per hospital and then for total number of hospitals per type in each province. The calculation of the weighted proportions was determined by the sampling strategy and accounts for the 2 hospital types and the 2 stages of chart review. All CIs were calculated at the 95% level. The  $\chi^2$  test for trend was used to compare AE rates among hospital types.

†The weighted rate of AEs and preventable AEs among infants 0-28 days was over 20 times greater among the those who were admitted to NICU for >24 hours compared to the infants with no NICU admission.

‡ When weighted for national distribution of the study sample there was no statistical difference in the AE rates between infants and children >28 days old who were designated as medical or surgical cases (p=0.06) however, the weighted proportion of AEs that were preventable was significantly higher among the Surgical cases.

**Appendix 3C: Most responsible service for delivery of care at the time of each of the 279 adverse events, overall by type of hospital, and by age group by type of hospital**

| Most Responsible Service | Adverse events, no. (%) |                |              |                | Academic Paediatric Centres |                       |                          |                         | p value | Community Hospitals     |                       |                          |                         | p value |
|--------------------------|-------------------------|----------------|--------------|----------------|-----------------------------|-----------------------|--------------------------|-------------------------|---------|-------------------------|-----------------------|--------------------------|-------------------------|---------|
|                          | Hospital Type           |                |              | RR (95% CI)    | Adverse events, no. (%)     |                       |                          |                         |         | Adverse events, no. (%) |                       |                          |                         |         |
|                          | Overall<br>n = 279      | APC<br>n = 210 | CH<br>n = 69 |                | 0-28 days<br>n = 52         | 29-365 days<br>n = 66 | 366 days-5 yrs<br>n = 42 | >5yrs-18 yrs.<br>n = 50 |         | 0-28 days<br>n = 11     | 29-365 days<br>n = 13 | 366 days-5 yrs<br>n = 18 | >5yrs-18 yrs.<br>n = 27 |         |
| Surgery                  | 98 (35.1)               | 88 (41.9)      | 10 (14.5)    | 2.9 (1.6-5.7)  | 5 (9.6)                     | 31 (47.0)             | 25 (59.5)                | 27 (54.0)               | <0.0001 | 0 (0.0)                 | 0 (0.0)               | 3 (16.7)                 | 7 (25.9)                | 0.07    |
| Medicine                 | 83 (29.8)               | 60 (28.6)      | 23 (33.3)    | 0.9 (0.6-1.3)  | 16 (30.7)                   | 12 (18.2)             | 14 (33.3)                | 18 (36.0)               | 0.1     | 1 (9.1)                 | 9 (69.2)              | 5 (27.8)                 | 8 (29.6)                | 0.01    |
| Emergency                | 23 (8.2)                | 12 (5.7)       | 11 (15.9)    | 0.4 (0.2-0.8)  | 3 (5.8)                     | 5 (7.6)               | 2 (4.8)                  | 2 (4.0)                 | 0.9     | 0.0                     | 1 (7.7)               | 7 (38.9)                 | 3 (11.1)                | 0.02    |
| ICU                      | 37 (13.3)               | 35 (16.7)      | 2 (2.9)      | 5.6 (1.4-34.4) | 19 (36.5)                   | 14 (21.2)             | 0 (0.0)                  | 2 (4.0)                 | <0.0001 | 2 (18.2)                | 0 (0.0)               | 0 (0.0)                  | 0 (0.0)                 | 0.02    |
| Maternal/Obstetrics      | 15 (5.4)                | 7 (3.3)        | 8 (11.6)     | 0.3 (0.1-0.8)  | 6 (11.5)                    | 1(1.5)                | 0 (0.0)                  | 0 (0.0)                 | 0.003   | 7(63.6)                 | 0 (0.0)               | 0 (0.0)                  | 1 (3.7)                 | <0.0001 |
| Other                    | 23 (8.2)                | 8 (3.8)        | 15 (21.7)    | 0.2 (0.1-0.4)  | 3 (5.7)                     | 3 (4.5)               | 1 (2.4)                  | 1 (2.0)                 | 0.8     | 1 (9.1)                 | 3 (23.1)              | 3 (16.7)                 | 8 (29.6)                | 0.6     |

Note: APC = academic pediatric centre, CH = community hospital, CI = confidence interval, NA = not applicable, RR = relative risk

Note: Relative risk is not available for age groups comparison; in their place, p values are provided.

\*Physician reviewers identified the clinical service responsible for patient care at the time that the adverse event occurred. For patients who experienced more than one adverse event, the most responsible clinical service may have differed for each or some of the adverse events. Therefore, results in this table are reported at the level of the adverse event (n=279) for the 237 patients who experienced one or more adverse events.

**Appendix 3D: Distribution of adverse events among 237 patients, grouped by factor to which event was related, overall by type of hospital, and age group by type of hospital. Comparison by hospital type and by Age Group within and between APC and CH**

| Factor related to event    | Patients, no. (%)* |                     |                     |                | Patients, no. (%)*          |                       |                          |                         | p value | Patients, no. (%)*  |                       |                          |                         | p value |
|----------------------------|--------------------|---------------------|---------------------|----------------|-----------------------------|-----------------------|--------------------------|-------------------------|---------|---------------------|-----------------------|--------------------------|-------------------------|---------|
|                            | Type of Hospital   |                     |                     | RR (95% CI)    | Academic Paediatric Centres |                       |                          |                         |         | Community Hospitals |                       |                          |                         |         |
|                            | Overall<br>n = 237 | Academic<br>n = 172 | Community<br>n = 65 |                | 0-28 days<br>n = 42         | 29-365 days<br>n = 50 | 366 days-5 yrs<br>n = 38 | >5yrs-18 yrs.<br>n = 42 |         | 0-28 days<br>n = 11 | 29-365 days<br>n = 12 | 366 days-5 yrs<br>n = 16 | >5yrs-18 yrs.<br>n = 26 |         |
| Surgical †                 | 78 (32.9)          | 64(37.2)            | 14 (21.5)           | 1.7 (1.0-3.1)  | 10 (23.8)                   | 24 (48.0)             | 13 (34.2)                | 17 (40.5)               | 0.1     | 1 (9.1)             | 0 (0.0)               | 4 (25.0)                 | 9 (34.6)                | 0.07    |
| Other clinical management‡ | 47 (19.8)          | 29 (16.9)           | 18 (27.7)           | 0.6 (0.4-1.1)  | 15 (35.7)                   | 7 (14.0)              | 5 (13.2)                 | 2 (4.8)                 | 0.001   | 6(54.6)             | 4 (33.3)              | 4 (25.0)                 | 4 (15.4)                | 0.1     |
| Medical procedure§         | 36 (15.2)          | 30 (17.4)           | 6 (9.2)             | 1.9 (0.8-4.9)  | 12 (28.6)                   | 11 (22.0)             | 1 (2.6)                  | 6 (14.3)                | 0.02    | 2 (18.2)            | 2 (16.7)              | 0 (0.0)                  | 2 (7.7)                 | 0.3     |
| Diagnostic error           | 34 (14.4)          | 19 (11.1)           | 15 (23.1)           | 0.5 (0.2-0.9)  | 5(11.9)                     | 3(6.0)                | 6(15.8)                  | 5(11.9)                 | 0.5     | 1 (9.1)             | 3 (25.0)              | 4 (25.0)                 | 7 (26.9)                | 0.7     |
| Drug §                     | 32 (13.5)          | 25 (14.5)           | 7 (10.7)            | 1.4 (0.6-3.3)  | 0 (0.0)                     | 5 (10.0)              | 12 (31.6)                | 8 (19.1)                | 0.0005  | 1 (9.1)             | 2 (16.7)              | 1 (6.3)                  | 3 (11.5)                | 0.9     |
| Anaesthesia                | 6 (2.5)            | 5 (2.9)             | 1 (1.5)             | 1.9 (0.2-42.7) | 1 (2.4)                     | 0(0.0)                | 2 (5.3)                  | 2 (4.8)                 | 0.4     | 0 (0.0)             | 0(0.0)                | 1 (6.3)                  | 0(0.0)                  | 0.6     |
| AE not covered elsewhere   | 3 (1.3)            | 2(1.2)              | 1 (1.5)             | 0.8 (0.1-21.0) | 0(0.0)                      | 0(0.0)                | 0 (0.0)                  | 2 (4.8)                 | 0.2     | 0 (0.0)             | 0 (0.0)               | 1 (6.3)                  | 0 (0.0)                 | 0.6     |
| Fluid                      | 2(0.8)             | 1 (0.6)             | 1 (1.5)             | 0.4 (0.0-13.8) | 0 (0.0)                     | 0(0.0)                | 0(0.0)                   | 1(2.4)                  | 0.7     | 0 (0.0)             | 0 (0.0)               | 1 (6.3)                  | 0(0.0)                  | 0.6     |
| Fracture                   | 2(0.8)             | 2(1.2)              | 0(0.0)              | 1.9 (0.1-39.2) | 0 (0.0)                     | 0(0.0)                | 0 (0.0)                  | 2 (4.8)                 | 0.2     | 0 (0.0)             | 0 (0.0)               | 0 (0.0)                  | 0(0.0)                  | -       |
| None                       | 3(1.3)             | 3 (1.7)             | 0(0.0)              | 2.7 (0.1-51.0) | 1(2.4)                      | 0(0.0)                | 1(2.6)                   | 1(2.4)                  | 0.7     | 0 (0.0)             | 0 (0.0)               | 0 (0.0)                  | 0(0.0)                  | -       |
| Unable to determine        | 13 (5.5)           | 8 (4.7)             | 5 (7.7)             | 0.6 (0.2-2.1)  | 1(2.4)                      | 5(10.0)               | 1(2.6)                   | 1(2.4)                  | 0.3     | 0(0.0)              | 2(16.7)               | 1(6.3)                   | 2(7.7)                  | 0.6     |

Note: APC = academic pediatric centre, CH = community hospital, CI = confidence interval, RR = relative risk.

Note: Relative risk is not available for age groups comparison, in their place, p values are provided.

\*Reviewers selected as many categories as applied when classifying procedures and events. Percentages in this table are based on total number of patients in the section (e.g., APC, CH); as a result, the sum of the percentages is not 100%.

†In the community hospitals children in over age 5 had significantly more surgically related adverse events than the other age groups.

‡'Other clinical management' includes failure of labour to progress or fetal distress resulting in emergency cesarean delivery, inappropriate discharge and inappropriate treatment by primary care giver. In both Academic and Community hospitals adverse events related to 'other clinical management' occurred significantly more often in neonates and significantly less often in children over 5 years

§In the academic centres children >1y to 5y had a significantly higher rate of drug related adverse events. Neonates, 0-28d had significantly fewer drug-related events whereas, they had significantly more medical procedure related adverse events, while children >1y-5 y had significantly fewer events.