

Report on Field Trial of APN ICD-10 Simplified Version

Field Trial Test in Cambodia,
February – May 2016

Why simplified version?



WHO-FIC
Asia Pacific
Network

ICD-10 Simplified
Version 2016

This is a copy of the APNICD-10 Simplified
Version 2016
released by the WHO-FIC Asia Pacific Network
in February 2016 (β-3 version)

- Make ICD coding easier than original version

Coding time comparison

| Steps | Traditional way coding time | Simplified way coding time |
|------------------------------|-----------------------------|----------------------------|
| 1. Keyword select | 3 minutes | 3 minutes |
| 2. ICD select | 3 minutes | 30 seconds |
| 3. ICD verify | 2 minutes | - |
| 4. Add 4 th digit | 1 minutes | - |
| 5. Assign code | 30 seconds | 30 seconds |
| Total time | 9 min 30 sec | 4 minutes |

APN ICD-10 Simplified Version

- **Is** a simplified ICD-10 alphabetical index. (vol. 3)
- **Not** a selected list of the ICD-10 tabular list. (vol.1)
- So ICD-10 codes were not reduced in the APN version
- Anyone can use the APN ICD-10 Simplified version together with ICD-10 tabular list for clinical coding without any difficulty.

Introduction of APN Simplified version in Cambodia

- Why Cambodia?
 - Join APN meeting since 2007 in Kyoto.
 - Show interests to try and test the APN Simplified version since 2014
- Cambodia current situation
 - Start ICD-10 usages in hospital morbidity statistics since 2012
 - Some hospital use PMRS list of ICD-10 codes to do ICD coding

ICD-10 list in PMRS system

IPD Pre-Defined Discharged Diagnoses

| Discharged Diagnoses | | ICD10 |
|----------------------------|------------------------------------|-------|
| 1. General medicine | | |
| 1 | Cholera | A00 |
| 2 | Unspecified Cholera | A00.9 |
| 3 | Typhoid Fever | A01 |
| 4 | Amoebiasis | A06 |
| 5 | Diarrhea without dehydration | A09 |
| 6 | Diarrhea with moderate dehydration | A09.1 |
| 7 | Diarrhea with severe dehydration | A09.2 |

Inappropriate Grouping

Incorrect Codes

Incorrect Codes

| | | |
|---------------------|--|--------|
| 7. Maternity | | |
| 136 | Ectopic Pregnancy | O00 |
| 137 | Hydatidiform mole | O01 |
| 138 | Early fetal death (pregnancy < 26 weeks) | O02.1 |
| 139 | Gestational oedema | O12.0 |
| 140 | Gestational Hypertension | O13 |
| 141 | Mild to moderate pre-eclampsia | O14.0 |
| 142 | Severe pre-eclampsia | O14.1 |
| 143 | Eclampsia | O15 |
| 144 | Hemorrhage during pregnancy (< 20 weeks) | O20 |
| 145 | Excessive vomiting during pregnancy | O21 |
| 146 | Placental disorders | O43 |
| 147 | Placenta accreta | O43.21 |
| 148 | Placenta percreta | O43.23 |

Incorrect Codes

ICD-10 list in PMRS system

| 4. Non-communication diseases | | |
|-------------------------------|---|-------|
| 72 | Diabetes 1 | E10 |
| 73 | Diabetes 2 | E11 |
| 74 | Severe acute malnutrition (SAM) with nutritional oedema | E40 |
| 75 | SAM with clinical signs | E41 |
| 76 | SAM - weight for height Z score < -3 Standard Deviation (SD) | E43 |
| 77 | Mild acute malnutrition - weight for height Z score -1 to -2 SD | E44.0 |
| 78 | Moderate acute malnutrition - weight for height Z score -2 to -3 SD | E44.1 |
| 79 | Harmful use of addicted substances | F11.1 |
| 80 | Secondary hypertension | I10.0 |
| 81 | Primary hypertension | I10.9 |
| 82 | Sequelae of cerebrovascular disease | I69 |
| 83 | Pregnant women with hypertension | O24.4 |

Inappropriate Grouping

| 7. Maternity | | |
|--------------|--|--------|
| 136 | Ectopic Pregnancy | O00 |
| 137 | Hydatidiform mole | O01 |
| 138 | Early fetal death (pregnancy < 26 weeks) | O02.1 |
| 139 | Gestational oedema | O12.0 |
| 140 | Gestational Hypertension | O13 |
| 141 | Mild to moderate pre-eclampsia | O14.0 |
| 142 | Severe pre-eclampsia | O14.1 |
| 143 | Eclampsia | O15 |
| 144 | Hemorrhage during pregnancy (< 20 weeks) | O20 |
| 145 | Excessive vomiting during pregnancy | O21 |
| 146 | Placental disorders | O43 |
| 147 | Placenta accreta | O43.21 |
| 148 | Placenta percreta | O43.23 |

Incorrect Codes

APN Activity for ICD-10 Implementation in Cambodia

- April 2015 APN + Future Group (USAID) arrange ICD-10 implementation workshop for MOH Cambodia
 - ICD-10 for morbidity and mortality statistics
 - Resources for ICD-10 implementation e.g. ICD coders recruitment, ICD10 books, coding job assignment and incentives
 - Introduction of the beta-2 version of APN ICD-10 Simplified version for Primary Care

APN Activity for ICD-10 Implementation in Cambodia

- October 2015 after some discussion with Dr.Kiry and WHO regional advisor (Jun Gao)
 - It was unlikely to use full ICD-10 version in the near future
 - MOH would like to try using APN ICD-10 simplified version for **hospital coding**.
 - APN Manchester meeting, Jun Gao informed that primary care version might not be a first priority, some countries for example Laos need simplified version for hospital coding.
 - APN agree to update APN ICD-10 simplified version for use in hospital (beta-3 version)

APN Activity for ICD-10 Implementation in Cambodia

- February 2016 APN and the Palladium(Future) Group arrange to workshop for MOH
 - ICD coding with APN Simplified Version beta-3
 - 10 hospitals will test coding with APN tool for 100 cases and report any problems or difficulties within March 18.
 - Field Trial Results will be report in the next APN meeting in June 2016.

Field Trial Plan

- *Objectives*

1. To study the feasibility of using the APN ICD-10 Simplified beta-3 Version in selected Cambodia Hospitals.
2. To identify factors which should be strengthened or prepared for successful implementation of ICD-10 in Cambodia health information system
3. To identify any demands for future development of the APN ICD-10 Simplified version

Trial Processes

1. Selection of ten target hospitals.
2. Each hospital/health centers find 100 cases with different disease/cases i.e.
 1. Infections 15 cases
 2. Injuries 15 cases
 3. Tumor or cancer 10 cases
 4. Pregnancy cases 10 cases
 5. Postpartum cases 5 cases
 6. Perinatal cases 5 cases
 7. Other diagnosis 40 cases
3. Each clinical coder or doctor complete the important information from each patient using the test from A1 (see Appendix) then assign ICD-10 codes selected from APN ICD-10 Simplified version book to each case with comment (if any).
4. Send the forms to the trial center in electronic files.

Field Trial Plan -2

Target Health Care Facilities 10 Hospitals
Testers 1-2 Doctors and/or Potential Clinical Coders from each facility

Number of Cases 1,000 cases (100 cases from each facility)

Project Duration 6 weeks

Activities

First week (1-5 February 2016)

2 days orientation courses for doctors or ICD coders

2nd – 6rd weeks (8 February – 18 March 2016)

Cases coding using APN ICD-10 Simplified version beta-3

7th week (21-25 March 2016)

Report summarization

Result : List of 10 Hospitals

| No. | Name of Provincial Hospital | Name of Participant | Title |
|-----|-----------------------------|---------------------|-------------------|
| 1 | Banteay Meanchey | Lay Vannarath | Physician |
| | | NeangSopheng | Admin. Vice-chief |
| 2 | Battambang | Oum Nhel | Deputy Director |
| | | Tin Saravuth | Admin. Officer |
| 3 | Pursat | Kong Chanrady | Physician |
| | | PrumSarom | HIS Officer |
| 4 | 16 Makara (Preah Vihear) | Chou Ponina | Deputy Director |
| | | Meas Rathanak | IT Officer |
| 5 | Kampong Chhnang | MeasDutty | Chief of TO |
| | | Ly Sarath | HIS Officer |
| 6 | Kampong Thom | Chan Sakhan | HIS Officer |
| | | KeoChanny | Physician |
| 7 | Prey Veng | Ung Chanthean | Director |
| | | Sok Kalyan | HIS Officer |
| 8 | Takeo | Mel Pognealey | Physician |
| | | Chea Huot | HIS Officer |
| 9 | Svay Rieng | An Sophy | Deputy Director |
| | | Riem Sina | HIS Officer |
| 10 | Kampong Cham | Mey Moniborin | Deputy Director |
| | | Kheang Bunsim | HIS Officer |

Results

- **Three** hospitals staff (Takeo, Svay Rieng and Kampong Cham) **never use** the local PMRS list to do ICD-10 coding. But other seven hospital staff had some experiences of using the PMRS list to do ICD-10 coding before.
- **Seven** hospitals could **complete the field trial work within agreed deadline** (6 weeks), but three hospitals (Pursat, 16 Makara, Prey Veng) could not finish the work and extended to continue work until 16th week.
- However, the field trial manager waited for their results to include all planned cases into the result analysis.

Results : Number of field trial cases and ICD-10 codes from each hospital.

| Hospital | No. Cases | No. ICD Codes |
|-----------------|-------------|---------------|
| Total | 1038 | 1099 |
| 1Bantay | 106 | 107 |
| 2Battambang | 97 | 100 |
| 3Pursat | 100 | 100 |
| 4Preyvihear | 91 | 91 |
| 5Kampongchanang | 117 | 118 |
| 6Kampongthom | 117 | 117 |
| 7Preyveng | 130 | 130 |
| 8Takeo | 111 | 128 |
| 9Svayreang | 85 | 108 |
| 10Kampongcham | 84 | 100 |

Table-3 Number of field trial cases group by ICD-10 Chapter.

| ICD Chapter | No. Cases | Frequency |
|--------------------------------|-------------|----------------|
| Total | 1038 | 100.00% |
| 1-Infection | 115 | 10.58% |
| 2-Neoplasm | 76 | 6.99% |
| 3-Blood diseases | 6 | 0.55% |
| 4-Endocrine&metabolic | 42 | 3.86% |
| 5-Mental disorders | 36 | 3.31% |
| 6-Nervous System Dis. | 31 | 2.85% |
| 7-Eye Disorders | 15 | 1.38% |
| 8-Ear Disorders | 5 | 0.46% |
| 9-Heart&vessels Dis. | 43 | 3.96% |
| 10-Respiratory Dis. | 84 | 7.73% |
| 11-Digestive Dis. | 102 | 9.38% |
| 12-Skin Diseases | 14 | 1.29% |
| 13-Musculoskeletal Dis. | 32 | 2.94% |
| 14-Genitourinary Dis. | 80 | 7.36% |
| 15-Pregnancy&Postpartum | 107 | 9.84% |
| 16-Perinatal&Neonatal | 30 | 2.76% |
| 17-Congenital Dis. | 3 | 0.28% |
| 18-Symptoms&Signs | 43 | 3.96% |
| 19-Injuries by Body Regions | 154 | 14.17% |
| 20-External causes of injuries | 25 | 2.30% |
| 21-Factors affecting health | 7 | 0.64% |
| Unknown | 37 | 3.40% |

Top-20 Cases group by ICD Chapters

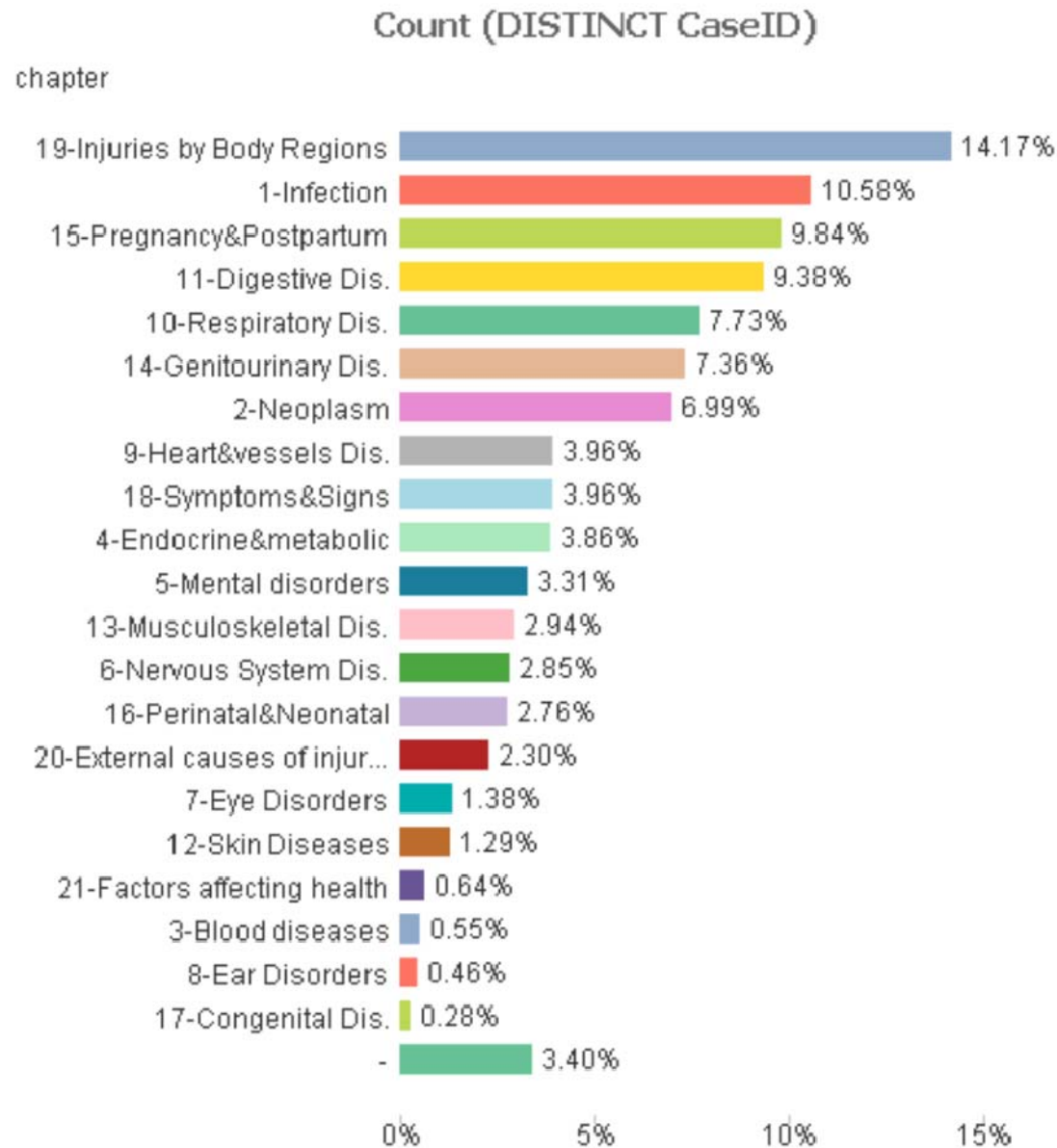


Table-4 use of ICD code labels instead of diagnosis terms from one hospital.

| Case No. | HN | Sex | Age | Age Unit | Diagnosis Terms |
|-----------------|---------------|------------|------------|-----------------|--------------------------------|
| 1 | 001-069-106-2 | Male | 17 | Years | Cholera, unspecified |
| 2 | 001-069-145-0 | Female | 14 | Years | Cholera, unspecified |
| 3 | 001-069-387-1 | Female | 15 | Years | Cholera, unspecified |
| 4 | 001-071-744-2 | Female | 63 | Years | Cholera, unspecified |
| 5 | 001-069-993-9 | Male | 3 | Months | Cholera, unspecified |
| 6 | 001-069-408-0 | Female | 10 | Years | Amebiasis |
| 7 | 001-069-083-2 | Male | 31 | Years | Typhoid and paratyphoid fevers |
| 8 | 001-072-323-2 | Male | 39 | Years | Typhoid and paratyphoid fevers |
| 9 | 001-074-723-0 | Female | 31 | Years | Typhoid and paratyphoid fevers |

ICD Coding Accuracy

| Hospital | Accuracy |
|-----------------|---------------|
| average | 80.71% |
| 4Preyvihear | 93.41% |
| 1Bantay | 89.72% |
| 6Kampongtom | 88.03% |
| 10Kampongcham | 87.00% |
| 8Takeo | 82.03% |
| 7Preyveng | 79.23% |
| 5Kampongchanang | 78.81% |
| 3Pursat | 72.00% |
| 2Battambang | 71.00% |
| 9Svayreang | 66.67% |

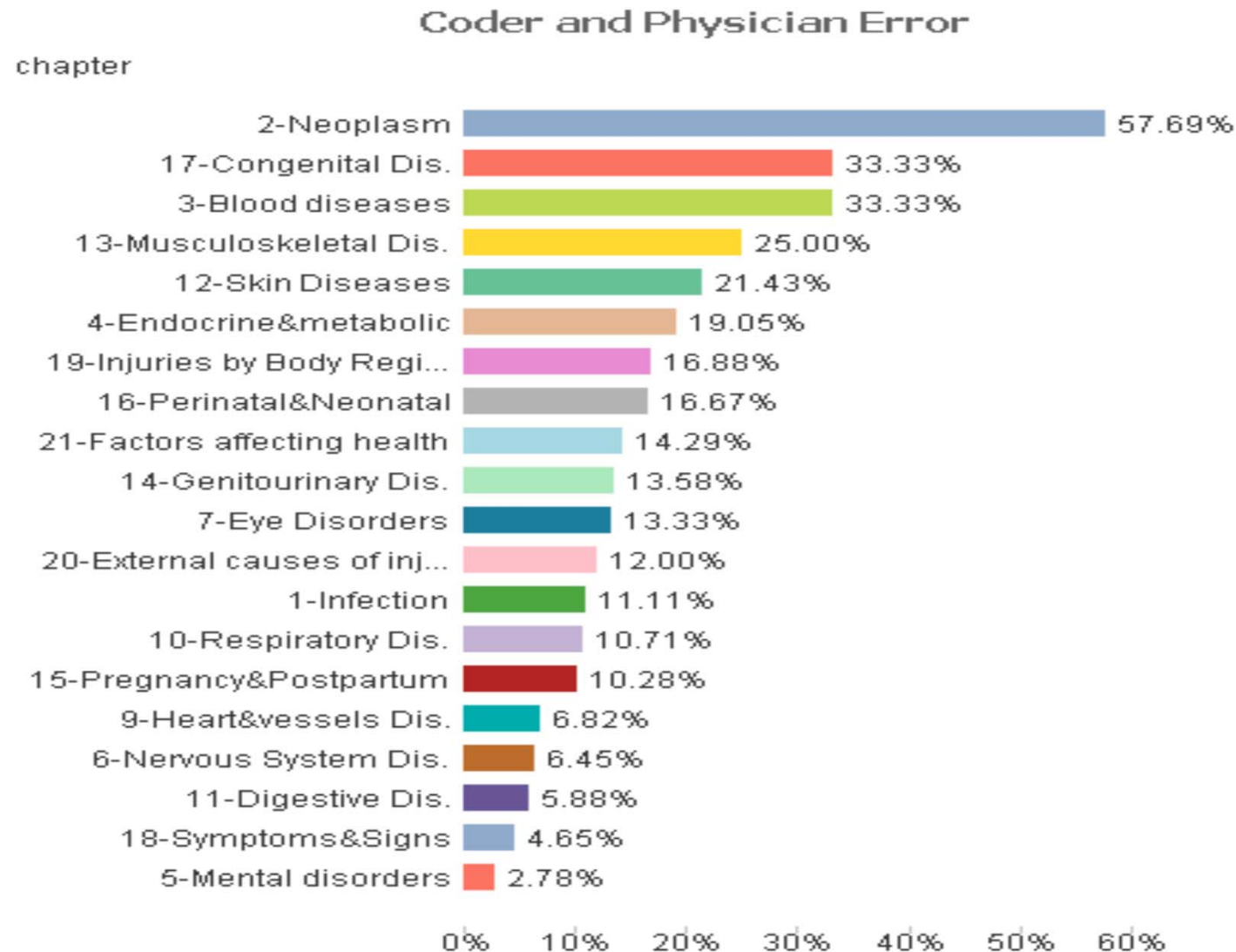
ICD Coding Errors

- **Coder Error** –is incorrect chosen of ICD codes by the clinical coders which may was caused by misunderstanding, misreading or mistyping of ICD codes into the report.
- **Physician Error** –is inappropriate record of diagnosis terms by doctor so the clinical coders could not find the suitable ICD code for the patient.
- **System Error** –is missing of diagnosis terms from the APN ICD-10 Simplified version so the clinical coders could not find the suitable ICD code for the patient.

ICD Coding Errors

| Hospital | Coder Error | Physician Error | System Error | Total Error |
|-----------------|---------------|-----------------|--------------|---------------|
| Total | 14.56% | 1.27% | 3.46% | 19.29% |
| 9Svayreang | 30.56% | 0.93% | 1.85% | 33.33% |
| 2Battambang | 25.00% | 0.00% | 4.00% | 29.00% |
| 3Pursat | 20.00% | 2.00% | 6.00% | 28.00% |
| 7Preyveng | 17.69% | 0.00% | 3.08% | 20.77% |
| 8Takeo | 13.28% | 0.00% | 4.69% | 17.97% |
| 5Kampongchanang | 12.71% | 3.39% | 5.08% | 21.19% |
| 10Kampongcham | 9.00% | 0.00% | 4.00% | 13.00% |
| 6Kampongthom | 7.69% | 1.71% | 2.56% | 11.97% |
| 1Bantay | 5.61% | 1.87% | 2.80% | 10.28% |
| 4Preyvihear | 3.30% | 3.30% | 0.00% | 6.59% |

Coder and physician errors for all patients group by ICD chapter



14 cases with physician errors.

| RecordID | Sex | Age | AgeUnit | DiagnosisTerms |
|----------|-----|-----|---------|--|
| 586 | 2 | 18 | years | Other inflammation of vagina and vulva |
| 732 | 1 | 21 | Years | Shooting Accidental |
| 605 | 2 | 21 | Years | Traumatic crannies |
| 585 | 2 | 25 | years | Other inflammation of vagina and vulva |
| 731 | 2 | 26 | Years | Bitten by centipede |
| 1087 | 1 | 28 | Years | Burn 40% over the body |
| 826 | 1 | 28 | Years | Burn by Hot Cooker |
| 613 | 2 | 32 | Years | Fracture of lumbar spine and pelvis |
| 566 | 1 | 41 | Years | Unknow Medicines |
| 729 | 2 | 45 | Years | Bitten by dog |
| 1061 | 1 | 50 | Years | Right leg trauma |
| 564 | 2 | 58 | Years | Thoracix oppression |
| 146 | 2 | 71 | Years | Occlusion |
| 834 | 2 | 90 | Years | Trauma/ FallDown |

Example of system errors.

| RecordID | Sex | Age | AgeUnit | DiagnosisTerms |
|-----------------|------------|------------|----------------|------------------------------|
| 10 | 2 | 26 | Years | vaginal hematoma post partum |
| 507 | 2 | 28 | Days | Beri Beri Cardiac |
| 829 | 1 | 28 | Years | Skull base Fracture |
| 837 | 1 | 28 | Years | Chest Trauma/ac |
| 269 | 1 | 32 | Years | Intracranial injury |
| 366 | 2 | 34 | Years | Hemorrhagic Strokes (Bleeds) |

Discussion

- Successful implementation of ICD-10 depends on two groups of staff in hospital i.e. physician and clinical coders.
- Physicians play important role on writing good diagnosis statement in the medical record
- while clinical coders assign ICD-10 codes based on diagnosis terms and patient context.

Discussion

- All ten hospitals in this field trial showed competency on recording diagnosis statement for each patient as well as assignment of ICD-10 codes based on each patient context.
- One hospital incorrectly use ICD-10 code labels instead of real diagnosis term but could change the error after requested by trial center.

Discussion

- APN ICD-10 Simplified version could be used effectively to assign ICD-10 codes for 96.45% of trial cases with 80.71% accuracy rate.
- The most common ICD coding errors was coder errors (14.56%).
- The accuracy rate will be higher if the clinical coders are well trained and strictly do ICD coding using standard coding guideline and practices.

Discussion

- Field trial results showed some issues that could be used to improve APN ICD-10 Simplified beta-3 version,
- for example at least 38 diagnosis terms should be added and some typing errors should be corrected.

Discussion

- To ensure high accuracy of ICD-10 coding, physician must be trained on the technics of “How to write good diagnosis terms.”
- Because if the physician write diagnosis terms using ambiguous or vague terms, the clinical coders will not be able to do ICD-coding correctly.

Conclusion

- The field trial results demonstrate the feasibility that the APN ICD-10 Simplified version could be used as an effective tool to do ICD-10 coding for hospitals in Cambodia.
- The simplified version could reduce coding time and efforts with acceptable accuracy.

Conclusion

- Developing countries should consider adapting the APN ICD-10 Simplified version for ICD-10 codes assignment in hospitals and health care centers.
- So producing morbidity statistics in the countries could be achieved easily.