



# Implementing the Episode Clinical Complexity Model

AR-DRG Version 8.0

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## AR-DRG V8.0 Terminology

- Terminology used in the new model has been modified to reflect changes in concept
- **Episode clinical complexity (ECC)** is the element of AR-DRGs that recognises and allows for cost variation within Adjacent DRGs (ADRGs). The following terms describe the various concepts within the ECC Model



## Terminology cont.

- **Diagnosis Complexity Level (DCL)** is the complexity weight assigned to each diagnosis within a particular ADRG
- **Complex Diagnoses (CDs)** in a particular ADRG are the set (or list) of diagnoses that have a non-zero DCL within an ADRG
- **Episode Clinical Complexity Score (ECCS)** is the measure of the cumulative effect of DCLs for a specific episode
- **Minor, Intermediate, Major** and **Extreme Complexity** are descriptive terms used in the naming of DRGs where ECCS has been used as a splitting variable



# AR-DRG Development Phases

- Two phases:
  - **Phase 1:** a major review of the existing Complication and Comorbidity system
    - outcome = ECC Model
  - **Phase 2:** Implementation of the ECC Model into the AR-DRG classification
    - outcome = ADRG splits based on ECCS and revised underpinning AR-DRG structure principles



## Phase 1

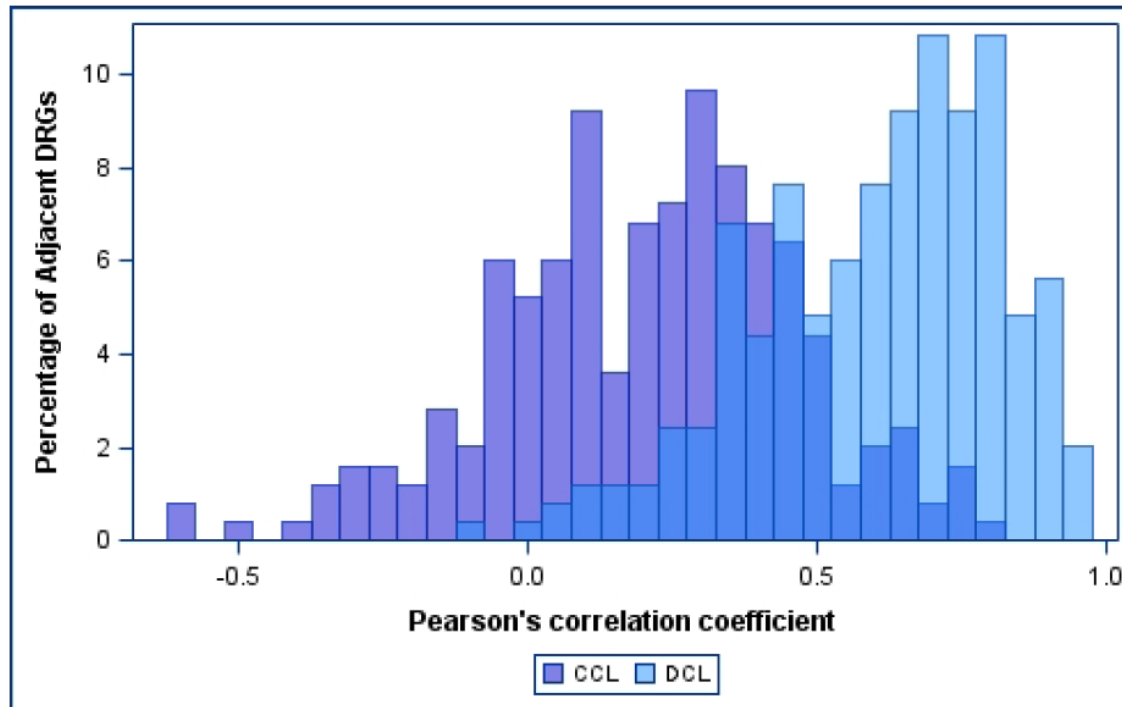
# Episode Clinical Complexity Model

- Analysis of recent years' patient and cost data indicated that current CCs were generally poorly related to cost variations within ADRGs
- Not surprising given the time elapsed since the development of the CC list and levels, and the limited data available at the time (AR-DRG V4.0)
- ACCD developed a revised approach, assisted by the DRG Technical Group and the Classification Clinical Advisory Group.



# 1. Diagnosis Complexity Level

Comparison of CCL and DCL correlations with cost among episodes with exactly two diagnoses





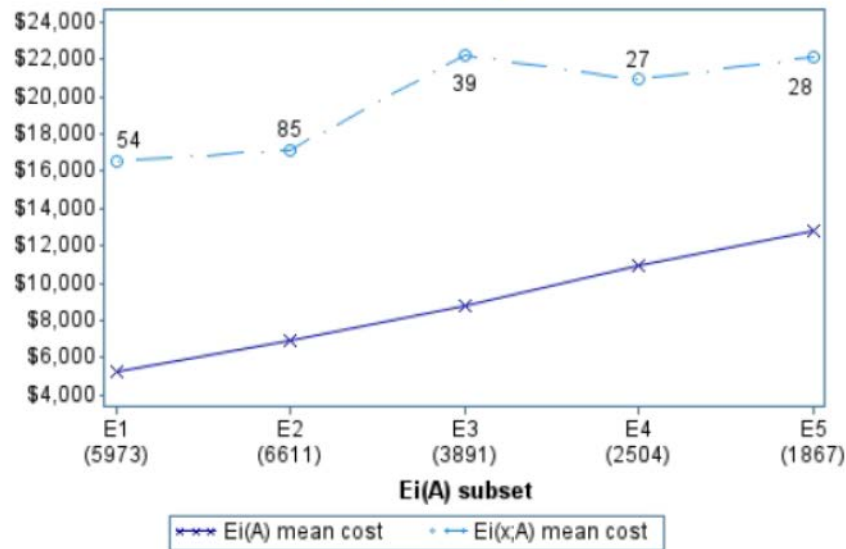
## Evidence based approach to complexity processing

- The ECC Model differs substantially from the approach originally taken in AR-DRG V4.0
- Developed using a robust conceptual and statistical methodology including the assignment of DCLs to selected diagnoses
- Principal diagnosis is now included in the calculation of the ECCS.



## Surgical DRG - PDx with a cost more than 3 times greater than the average diagnosis within ADRG F14

Adjacent DRG=F14 - Vascular Procedures, Except Major Reconstruction, W/O CPB  
Pump ICD-10-AM 8th Edition Diagnosis Code=I72.0 - Aneurysm and dissection of carotid artery



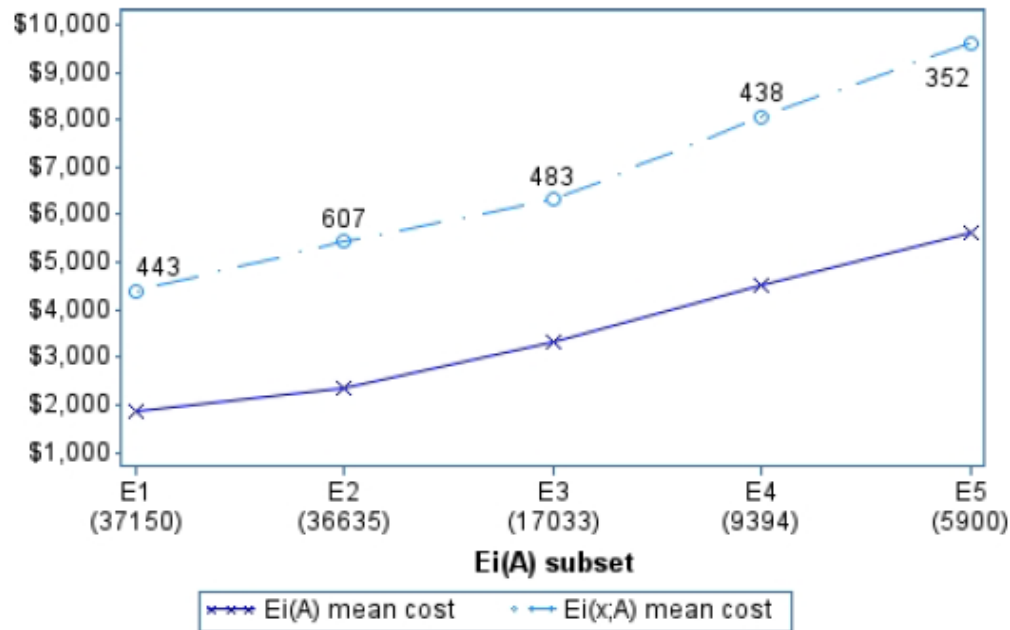




## Medical ADRG - where a specific PDx adds additional resources

*For the PDx of A04.7 in the ADRG G67, it adds \$2,500 to \$4,000 across each of the groups. The 443 cases where A04.7 occurs as a PDx with no additional diagnosis, A04.7 adds approximately an extra \$2,500 compared to the average PDx's in this DRG. Where A04.7 (352 cases) occurs with 4 other diagnoses, A04.7 adds approximately an extra \$4,000 compared to the average episode with 5 diagnoses in this DRG. The extra costs for the PDx is maintained irrespective of the number of additional diagnoses associated with it.*

Adjacent DRG=G67 - Oesophagitis and Gastroenteritis ICD-10-AM 8th Edition  
Diagnosis Code=A04.7 - Enterocolitis due to Clostridium difficile



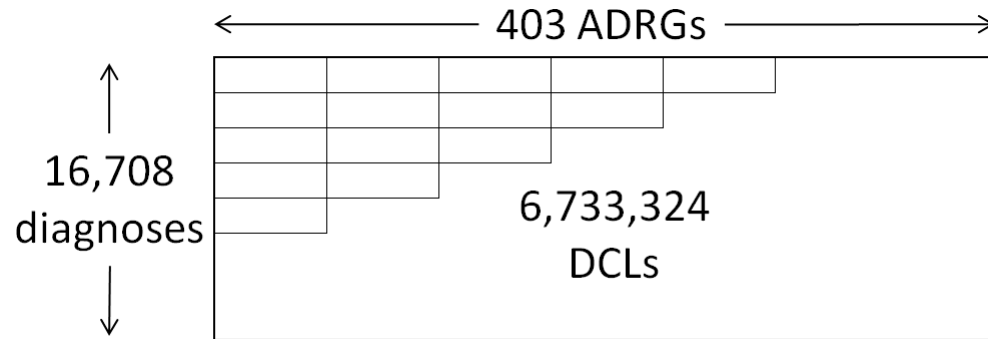


## Episode Clinical Complexity Model

1. Estimation of the relative effect of each diagnosis on costs for each ADRG
  - Diagnosis Complexity Level  $DCL(x, A)$
2. Combination of DCLs across each episode to estimate the cumulative cost due to complexity at the episode level
  - Episode Clinical Complexity Score  $ECCS(e)$



# 1. Diagnosis Complexity Level



- DCL values range between 0 and 5
- Diagnoses identified as out of scope for the ECC Model are assigned a DCL of zero across all ADRGs (unconditional exclusions)
- Conditional exclusions are also used to set the DCL of particular diagnoses to zero conditional to the presence of other diagnoses



## 2. Episode Clinical Complexity Score

- ECCS values range between 0 and 32
  - around 40% have an ECCS of zero and 0.5% have an ECCS of 10+
- Multiple DCLs make diminishing contributions to ECCS



## Phase 2

### Implementing the ECC Model

- Approach – adherence to AR-DRG classification structure principles
- Minimal use of administrative (non-complexity) splitting variables
- Strong preference for ADRG splits based only on ECCS



## AR-DRG Structure Principles

- Clinically coherent
- Reasonably homogeneous in resource use
- Classification soundness
- Operationally acceptable and robust



## Splitting Models

- A short list of four best performing splitting models was selected for each ADRG and compared to each other and against AR-DRG Version 7.0.
- These four ADRG splitting models were selected to carry the following properties:



## Splitting Models cont.

- **Model 1:**
  - Always has the same number of splits as in AR-DRG V7.0
  - Uses non-ECCS (i.e. non complexity) splitting variables wherever AR-DRG V7.0 does
  - Best efforts to satisfy splitting criteria but may not always satisfy criteria
- **Model 2:**
  - May or may not have the same number of splits as in AR-DRG V7.0
  - May use non-ECCS splitting variables wherever AR-DRG V7.0 does but is able to use ECCS alone if performance is improved
  - Always satisfies splitting criteria





## Splitting Models cont.

- **Model 3:**
  - Always has the same number of splits as in AR-DRG V7.0
  - Uses ECCS alone as a splitting variable
  - Best efforts to satisfy splitting criteria but may not always satisfy criteria
- **Model 4:**
  - May or may not have the same number of splits as AR-DRG V7.0
  - Uses ECCS alone as a splitting variable
  - Always satisfies splitting criteria



## Splitting Model Selection

- Model 4 (ECCS only) was generally selected as the preferred splitting model for each ADRG
- After clinical and jurisdictional input, Model 1, 3 or a modification of 3 were selected where non-complexity splitting variables were required to be maintained or a set number of splits preserved
- DTG and CCAG input was sought to determine final model selection



## Transfer as a splitting variable

- Transfer as a splitting variable was maintained for:
  - B70 *Stroke and other cerebrovascular disorders*
  - B78 *Intracranial injuries*
  - F60 *Circulatory disorders, admitted for AMI w/o invasive cardiac investigation procedures*
  - F62 *Heart failure and shock*



## Enhanced DCL precision

- Undertaken for *N18.- CKD* by grouping the codes contained within it into three categories and assigning common DCLs within each category:
  - *N18.1, N18.2* and *N18.9* were combined and assigned common DCLs
  - *N18.3* and *N18.4* were combined and assigned common DCLs
  - *N18.5* was individually assigned DCLs



## Results

- AR-DRG structure has remained largely the same as in AR-DRG V7.0
- AR-DRG V8.0 comprises
  - 403 non-error ADRGs (with 3 error ADRGs: 960, 961 and 963), made up of
  - 804 non error DRGs (with 3 error DRGs):
    - 960Z *Ungroupable*
    - 961Z *Unacceptable Principal diagnosis*
    - 963Z *Neonatal Diagnosis Not Consistent W Age/Weight*



## AR-DRG Version 8.0

- In total AR-DRG V8.0 has 807 DRGs. Of the 406 (including 3 error) ADRGs:
  - 85 have no split (Z) (including 3 error ADRGs)
  - 246 have one split (A, B)
  - 70 have 2 splits (A, B, C)
  - 5 have 3 splits (A, B, C, D)



## AR-DRG Version 8.0 cont.

- Of the 321 ADRGs that have a split:
  - 315 ADRGs use ECCS as the only splitting variables
  - 6 ADRGs use splitting variables other than ECCS, specifically:
    - A07 and A09 use ECCS and age
    - B70, B78, F62 use ECCS and transfer
    - F60 uses transfer only



# Comparison – AR-DRG V7.0 to V8.0

*(Note: 3 error ADRGs and DRGs not included)*

		Number ADRGs by constituent DRG count, V7.0				TOTAL
		1 DRG / no split	2 DRGs / 1 split	3 DRGs / 2 splits	4 DRGs / 3 splits	
Number ADRGs by constituent DRG count, V8.0	1 DRG / no split	82				82
	2 DRGs / 1 split	45	164	37		246
	3 DRGs / 2 splits		29	40	1	70
	4 DRGs / 3 splits				5	5
TOTAL		127	193	77	6	403





## Number of ADRGs by splitting variables

Splitting variables	ADRG v7.0		ADRG v8.0	
	Count	Percentage	Count	Percentage
Nil – no split	127	32%	82	20%
PCCL/ECCS only	168	42%	315	78%
PCCL/ECCS with other/s	74*	18%	5**	1%
Other/s only	34*	8%	1**	0%
Total	403	100%	403	100%



## Conclusion

- AR-DRG V8.0 represents a significant refinement to the AR-DRG classification with:
  - major improvement in the measurement of clinical complexity through the use of the ECC Model
  - simplified splitting logic
- The new model will facilitate:
  - greater transparency in the AR-DRG refinement process
  - consistency and ease of update over time to keep abreast of changes in clinical practice and improvements in data quality.



# Thank you

Reference documents available at:

<http://ihpa.gov.au/internet/ihpa/publishing.nsf/Content/admitted-acute>

Contact: [enquiries@accd.net.au](mailto:enquiries@accd.net.au)

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