CMG+ Highlights
Overview of the new acute care inpatient grouping methodology

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Purpose of Grouping Methodology

Infinite # of combinations of diagnoses and procedures

Reasonable number of groups with which to make comparisons between patient types
What does a CMG provide?

- A description of the hospital product
- A method of reviewing the hospital resources
- A description for hospital comparisons, i.e. eCHAP reports
Underlying Principles in CMG+ Development

- Reengineer CIHI’s acute care inpatient grouping methodology with:
  - ICD-10-CA/CCI classification systems, to make full use of their increased specificity, thereby increasing clinical homogeneity; and
  - ICD-10-CA/CCI cost data and Length of Stay (LOS) activity data to provide increased resource homogeneity

- Build a robust inpatient grouping methodology that is less susceptible to over/under coding
Addressing Data Quality Issues

• Data quality challenges and analytical solutions for the development of CMG+:
  – Trends in findings of previous DAD re-abstraction studies
  – Findings of the Ontario Case Costing re-abstraction study
  – Implications of data quality issues for building new grouping methodology

• Methodology enhancements, including Factors
  – Greater emphasis on Interventions to reflect additional resource use and maintain coding objectivity
  – Improve quality of DAD data for purposes other than grouping
Developing CMG+

‘Building a revised acute care inpatient grouping methodology is a once in a life time opportunity. CIHI should investigate all options/methodologies when building the new ICD-10-CA/CCI grouping methodology.’

Fall 2003 - National Data Quality and CMG Redevelopment Steering Committee

- 3 alternative approaches to high level business rules developed and analyzed over 8 month period
- Unanimous decision made by Grouper Redevelopment Advisory Committee (GRAC) members on September 30, 2004
  - Current Business Rule Approach
  - Most Responsible Diagnosis will determine the assignment of a patient case to a Major Clinical Category
Current Business Rule Approach - Why Selected:

- Easily understood by users
- Represents the least change from the present grouping methodology
- Consistently out performed the other approaches across following criteria:
  - clinical relevance
  - logical hierarchy
  - transparency
  - explanation of variation in costs
- Most relevant to the organization of hospitals
- More flexible and is more suited to health care policy planning and implementation
Five Factors Methodology

- Replaces previous Plx/Age Overlay methodology
- Applied after CMG assignment (where applicable)
- Five Factors:
  1. Age Category
  2. Comorbidity Level
  3. Flagged Intervention
  4. Intervention Event
  5. Out of Hospital Intervention

- Five factors combine to create Resource Intensity Weights (RIW)
Factor 1. Age Category

3 Age Categories (up to 9 groups)

- Based on analysis of cost and activity data
- Reviewed and approved by GRAC, Clinical Panel, Clinical Working Groups (Pregnancy & Childbirth, NB & Neonate)
  - Newborn & Neonate
    - 0 day
    - 1 - 7 days
    - 8 - 28 days
  - Paediatric
    - 29 - 364 days
    - 1 - 7 years
    - 8 - 17 years
  - Adult
    - 18 - 59 years
    - 60 - 79 years
    - 80 + years
Factor 2. Comorbidity Level

- List of specific ICD-10-CA diagnosis codes
  - Patient cost impacted by minimum 25%
  - Data quality performance (based on findings from re-abstraction studies)
  - Clinical review

- Comorbidity level is determined based upon cumulative cost impact of these comorbidities on the patient stay:
  
  Level 0  ( 0 - 24% impact on resource consumption)
  Level 1  (25 - 49% impact on resource consumption)
  Level 2  (50 - 74% impact on resource consumption)
  Level 3  (75 - 124% impact on resource consumption)
  Level 4  (125+% impact on resource consumption)
Factor 3. Flagged Intervention

- List of select CCI Interventions – 14 categories

  Feeding Tubes (PEG)  Pleurocentesis
  Vascular Access Device  Dialysis
  Tracheostomy  Radiotherapy
  Chemotherapy  Mechanical Ventilation Long > 96 hr
  Paracentesis  Mechanical Ventilation Short < 96 hr
  Heart Resuscitation  Cell Saver
  Cardioversion  Parenteral Nutrition

- Flags to identify patients likely to consume significant resources; interventions not necessarily costly

- Distribution examples using fiscal 2005/06 data:
  - Tracheostomy: distributed over 320 different CMG
  - Mechanical ventilation < 96 hours: distributed over 481 CMG
Factor 4. Intervention Event

• Count of separate intervention events (DAD Episodes) as identified on the DAD abstract
  – each intervention date/time

• Only interventions that are on the CCI Intervention Partition code list are included in the Intervention Event Factor, thus no change to existing coding standards practices is required

• Intervention events will be considered in the RIW and ELOS calculations based on the occurrence of 2 or 3+ intervention events
Factor 5. OOH Intervention

- CMG assignment will continue to include *Out of Hospital* (OOH) interventions as applicable
  - Eg. CMG 201-Arrhythmia with Cardiac Catheter will be assigned even if the cardiac catheterization took place at another hospital

- Patient cases where select *cardiac* interventions occur at another facility, a negative factor will be applied to adjust the RIW downward for the host facility
  - Cardiac Catheter, Percutaneous Coronary Intervention (PCI), Pacemaker
Pilot organizations were the first in the country to be introduced to CMG+, which provided them with the opportunity to:

- Learn about the inputs and components of the new CMG+ methodology;
- Find out how to utilize and interpret the new methodology; and
- Gain a head start on planning for the incorporation of CMG+ and associated factors into their utilization management and decision support reporting activities beginning in fiscal 2007-08

Total Facilities: 91

- Pan Canadian mix of community, teaching, and paediatric facilities in urban and rural areas
CMG+ Pilot Feedback

• Many participant sites had the opportunity to share new methodology with program managers and physicians

✓ Maintaining current business rule; easily understood: transparent, logical
✓ Methodology intuitive
✓ Makes clinical sense: clinically relevant
✓ Emphasis on interventions
✓ 5 Factor contribution
✓ Removing pressure from coders to determine comorbidity typing; ‘happy not hanging hat on comorbidity’
## CMG+ Performance

<table>
<thead>
<tr>
<th>Data</th>
<th>CMG Plx Final 2004 R-Square</th>
<th>CMG+ Final 2004 R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>All LOS</td>
<td>8.9%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Typical LOS</td>
<td>47.4%</td>
<td>50.2%</td>
</tr>
<tr>
<td>All Cost</td>
<td>41.2%</td>
<td>60.4%</td>
</tr>
<tr>
<td>Typical Cost</td>
<td>52.5%</td>
<td>66.0%</td>
</tr>
</tbody>
</table>

Greater than 13% difference in Typical Cost R-Square!
Comparing CMG+ and CMG/Plx Typical Cases

Without even considering comorbid conditions, the CMG+ methodology outperforms the CMG/Plx methodology.

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<thead>
<tr>
<th>Model</th>
<th>Plx - R-Square Typical Cost</th>
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</thead>
<tbody>
<tr>
<td>MCC</td>
<td>7.0%</td>
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<tr>
<td>MCC, Plx Partition</td>
<td>11.3%</td>
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<tr>
<td>MCC, Plx Partition, Age</td>
<td>11.7%</td>
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<tr>
<td>MCC, CMG, Age</td>
<td>42.1%</td>
</tr>
<tr>
<td>MCC, CMG, Age, Plx</td>
<td>52.5%</td>
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<table>
<thead>
<tr>
<th>Model</th>
<th>CMG+ R-Square Typical Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC</td>
<td>6.8%</td>
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<tr>
<td>MCC, Partition</td>
<td>10.8%</td>
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<tr>
<td>MCC, Partition, Age</td>
<td>11.4%</td>
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<td>MCC, Age, CMG</td>
<td>33.8%</td>
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<tr>
<td>MCC, Age, CMG, Fl</td>
<td>59.9%</td>
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<tr>
<td>MCC, Age, CMG, Fl, IE</td>
<td>62.6%</td>
</tr>
<tr>
<td>MCC, Age, CMG, Fl, IE, OOH</td>
<td>62.7%</td>
</tr>
<tr>
<td>MCC, Age, CMG, Fl, IE, OOH, CL</td>
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Implementation Support Tools

• Education:  [www.cihi.ca/education](http://www.cihi.ca/education)
  – 5 eLearning modules
  – 1 PDF document Executive Summary

• Facility Specific Transition Reports
  – Will allow clients to compare their 2005/06 summary level data grouped by both CMG/Plx and CMG+ methodologies
  – Available Q1 Fiscal 2007-08 via CIHI’s Web Client Services (DAD eHSR)

• Historical Regrouped Data:
  – Fiscal years 2001/02 – 2006/07
  – Available starting summer 2007

• CMG+ Documents: [www.cihi.ca/casemix](http://www.cihi.ca/casemix)

• Technical Questions: [www.cihi.ca/equery](http://www.cihi.ca/equery)