International Symposium
for DRG based Payment

Experiences of DRG based payment
in Korea, Japan and Taiwan, and its Future

일시 : 2011. 12. 16(금) 14:00~18:00
장소 : 대한상공회의소 의원회의실
Experience & prospect of DRG based payment in Korea

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Chungbuk National University
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1. Background
Payment system for health services in Korea

- Basically health services are reimbursed through fee-for-service (FFS) for all services and at all referral levels
- Fee for Service = Relative Value X Conversion Factor X Type Adjustment Rate
- Relative Value is determined by amount of resource (physician work + practice expense + malpractice expense)
- Conversion Factor is negotiated between insurer and providers annually
- Type Adjustment Rate is fixed value by type of treatment institution
Conversion factor and total health insurance expenditure

- Blue line: Conversion Factor
- Red line: Total Health Insurance Expenditure
Problems of uncovered services

- Price of uncovered services are determined by providers without intervention of government or insurer
- The profit of uncovered service is higher than that of covered service
- So, uncovered services like cosmetic surgeries are unnecessarily expanding, but covered services are relatively shrinking
Vicious cycle in health insurance

- Low Coverage Rate
- Low Price of Covered Services
- Increase of the Volume of Covered Services
- Unnecessary Expansion of Uncovered Services
- Increase of Total Health Expenditure

Fee for Service

Providers: Low price of covered services and distortion of medical practice
Insurer: Rapid increase of health insurance expenditure
Insured: High coinsurance
Need for payment system reform

- Although unit price (conversion factor) is constrained, total expenditure is rapidly increasing because of service volume increase.
- So payment system reform is needed to control service volume increase.
- Introduction of prospective payment system like DRG, Capitation, Global budgeting is considered.
2. DRG PPS for 7 disease groups

DRG based payment in Korea
History of DRG PPS in Korea

- 1994 : The Committee of Medical Security Reform recommended the introduction of DRG payment system
- 1997 : 1\textsuperscript{st} Demonstration Program (8 disease groups)
- 1998 : 2\textsuperscript{nd} Demonstration Program (8 disease groups)
- 1999 : 3\textsuperscript{rd} Demonstration Program (15 disease groups)
- 2002 : Introduction of DRG PPS for 7 disease groups on voluntary basis
7 Disease groups
(51 DRGs in KDRG 2.1)

- Caesarean section(3 DRGs)
- Appendectomy(6 DRGs)
- Lens procedure(12 DRGs)
- T&A procedure(4 DRGs)
- Inguinal & femoral hernia procedure(8 DRGs)
- Uterine & adenexa procedure for non-malignancy(12 DRGs)
- Anal procedure(6 DRGs)

* The total number of DRGs increased to 61 since KDRG 3.3 implementation (2010)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>54</td>
<td>132</td>
<td>798</td>
<td>1,268</td>
<td>1,645</td>
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<tr>
<td>General Hospital</td>
<td>19</td>
<td>29</td>
<td>78</td>
<td>106</td>
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<tr>
<td>Hospital</td>
<td>11</td>
<td>31</td>
<td>609</td>
<td>1,035</td>
<td>1,391</td>
</tr>
</tbody>
</table>

Type and number of providers participating in DRG PPS (1)
## Type and number of providers participating in DRG PPS (2)

<table>
<thead>
<tr>
<th>Type</th>
<th>2002 (participating rate)</th>
<th>2003 (participating rate)</th>
<th>2004 (participating rate)</th>
<th>2005 (participating rate)</th>
<th>2006 (participating rate)</th>
<th>2007 (participating rate)</th>
<th>2008 (participating rate)</th>
<th>2009 (participating rate)</th>
<th>2010 (participating rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>1,839</td>
<td>1,965</td>
<td>2,066</td>
<td>2,213</td>
<td>2,277</td>
<td>2,350</td>
<td>2,365</td>
<td>2,283</td>
<td>2,325</td>
</tr>
<tr>
<td><strong>Tertiary care hospital</strong></td>
<td>[57.5%]</td>
<td>[59%]</td>
<td>[60.6%]</td>
<td>[62.8%]</td>
<td>[66.4%]</td>
<td>[69.0%]</td>
<td>[69.6%]</td>
<td>[68%]</td>
<td>[69.9%]</td>
</tr>
<tr>
<td><strong>General hospital</strong></td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Hospital</strong></td>
<td>109</td>
<td>112</td>
<td>102</td>
<td>101</td>
<td>96</td>
<td>101</td>
<td>93</td>
<td>77</td>
<td>75</td>
</tr>
<tr>
<td><strong>Clinic</strong></td>
<td>1,573</td>
<td>1,677</td>
<td>1,778</td>
<td>1,923</td>
<td>1,979</td>
<td>2,050</td>
<td>2,082</td>
<td>2,031</td>
<td>2,076</td>
</tr>
</tbody>
</table>

[60.5%] [62.5%] [66%] [69.5%] [74.0%] [78.0%] [79.3%] [78.3%] [80.9%]
## No. of claims & expenses paid by DRG PPS

<table>
<thead>
<tr>
<th>Demonstration Program</th>
<th>No. of Claims</th>
<th>Total expenses (million Won)</th>
<th>Amount paid by insurer (million Won)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st 1997</td>
<td>41,780</td>
<td>28,541</td>
<td>23,059</td>
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<td>2nd 1998</td>
<td>167,878</td>
<td>128,734</td>
<td>104,274</td>
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<tr>
<td>3rd 1999</td>
<td>375,766</td>
<td>286,828</td>
<td>233,652</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>581,236</td>
<td>347,396</td>
</tr>
<tr>
<td></td>
<td>2001</td>
<td>650,970</td>
<td>397,621</td>
</tr>
<tr>
<td>DRG Case payment on elective basis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>640,919</td>
<td>457,532</td>
<td>367,534</td>
</tr>
<tr>
<td>2003</td>
<td>655,810</td>
<td>490,797</td>
<td>393,826</td>
</tr>
<tr>
<td>2004</td>
<td>594,681</td>
<td>480,946</td>
<td>387,022</td>
</tr>
<tr>
<td>2005</td>
<td>611,609</td>
<td>504,066</td>
<td>406,055</td>
</tr>
<tr>
<td>2006</td>
<td>635,615</td>
<td>543,713</td>
<td>440,963</td>
</tr>
<tr>
<td>2007</td>
<td>671,511</td>
<td>602,749</td>
<td>489,055</td>
</tr>
<tr>
<td>2008</td>
<td>687,147</td>
<td>622,380</td>
<td>501,700</td>
</tr>
<tr>
<td>2009</td>
<td>705,877</td>
<td>657,544</td>
<td>530,300</td>
</tr>
<tr>
<td>2010</td>
<td>726,281</td>
<td>706,062</td>
<td>569,560</td>
</tr>
</tbody>
</table>
Problems of DRG PPS for 7 disease groups

- Government tried to introduce the compulsory DRG PPS several times
- However because of strong opposition of providers, DRG PPS was introduced on voluntary basis
- Voluntary DRG PPS has many problems
  - Providers which have high cost (e.g. large hospital) remain in FFS
  - Only providers which have low cost (e.g. clinics), so have more profit than FFS, participate in DRG PPS
  - So, cost control mechanism of DRG PPS does not work
- In Addition, PPS is applied to only 7 disease groups, so we have the task to expand DRGs to which PPS is applied
Ratio of DRG payment rate to FFS payment rate

- DRG payment rate is higher than FFS because of higher coverage rate & incentive
- Recently, the difference between DRG payment rate and FFS payment rate is decreasing especially for large hospitals.

![Graph showing the ratio of DRG payment rate to FFS payment rate from 1999 to 2006. The x-axis represents years from 1999 to 2006, and the y-axis represents the ratio ranging from 100 to 135. The graph includes data points for Tertiary hospital, General hospital, Hospital, and Clinic. There are markers indicating introduction of RBRVS in FFS and adjustment of DRG payment rate.]
3. New approach, KCPS

DRG based payment in Korea
New approach for introducing DRG based payment

- Developing mixed payment system which can be applied to the all inpatients
  - Payment per admission episode
  - Per-diem payment
  - FFS for physician’s procedure or high price services

- Introducing DRG based payment to all patients by hospital instead of introducing DRG PPS by disease groups
  - Although it is easy to apply DRG PPS to simple disease groups, it is very difficult to expand DRG PPS to complicated disease groups
Korean Case Payment System (KCPS)

- New DRG based payment system is named as “KCPS”
- KCPS demonstration program
  - NHIC Ilsan Hospital
    - 1st: April 2009 ~ June 2010 『20 ADRGs』
    - 2nd: July 2010 ~ June 2011 『76 ADRGs』
    - 3rd: July 2011 『553 ADRGs』; all patients except a few cases
  - Regional public hospitals
    - 3 regional public hospitals: July 2011 『76 ADRGs』
    - 40 regional public hospitals: 2012 『553 ADRGs』
**Payment scheme of KCPS**

**DRG PPS for 7 disease groups**

<table>
<thead>
<tr>
<th>Bundled services</th>
<th>Unbundled services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment per admission episode</td>
<td>FFS for new technology, diet, etc</td>
</tr>
</tbody>
</table>

**KCPS**

<table>
<thead>
<tr>
<th>Bundled services</th>
<th>Unbundled services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment per admission episode + Per diem payment</td>
<td>FFS for 80% of unit price (20% is paid with bundled services)</td>
</tr>
</tbody>
</table>
Bundled & unbundled services

**Bundled services**

- Procedures, drugs, materials the unit price of which are lower than 100,000 won
- Including not only covered services but also uncovered services
- The following items are bundled regardless of unit price
  - Computed tomography (CT)
  - Ultrasonography (excluding ultrasonography for procedure)

**Unbundled services**

- Procedures, drugs, materials the unit price of which are more than 100,000 won
- The following items are unbundled regardless of unit price
  - Doctors’ procedure (for example, surgeries or endoscopic procedures)
  - Particular drugs used in psychiatrics
  - ICU or segregation room cost
  - Limited antibiotics
  - CPR
  - Dialysis
  - Blood and blood component
  - Meals
Calculation of KCPS payment

KCPS payment of DRGi patient = Standard payment for DRGi + (real patient days – average patient days of DRGi) x per-diem payment for DRGi + FFS payment

- Standard Payment for DRGi: calculated using the treatment expense of inpatients hospitalizing for average inpatient days of DRGi
- Per-diem Payment for DRGi: set as 80% of real per-diem expense to give incentive to low LOS
- FFS payment: set as 80% of unit price to prevent the excessive utilization of FFS items
Payment for bundled services

- Lower limit of LOS (5 percentile)
- Average LOS
- Upper limit of LOS (95 percentile)

FFS:
- Standard payment

KCPS:
- Standard payment + per diem

Normal group:
- FFS for additional days above upper limit

Upper outlier:
- Total expense occurred

KCPS payment (standard + per diem)
Patient coinsurance

◆ Bundled services
  - Till average LOS: 20%
  - After average LOS: 23% except psychiatric patients

◆ Unbundled services
  - 20%
Hospital specific adjustment rates

- Hospital specific adjustment rates are used for the transition from FFS to KCPS under budget neutrality.
- There are 3 kinds of adjustment rates:
  - Adjustment rate for medical treatment groups
  - Adjustment rate for surgical treatment groups
  - Adjustment rate for psychiatric patients
- In future, these should be phased to the flat rate specific to the nature of hospital (e.g. the position on the health referral system, medical education, rural hospital etc.)
Evaluation of KCPS (1)

- It is too early to evaluate the effect of KCPS
- Some results of evaluation of KCPS demonstration program in Ilsan hospital (2010)
  - Distribution of patient groups (’09. 7 – ’10. 6)
    - Normal group: 93%
    - Upper outlier: 4%
    - Lower outlier: 3%
  - Payment accuracy (compared to FFS) : higher than original DRG PPS
Evaluation of KCPS (2)

- Increased coverage rate (patient burden decreases by 7.9%)
- Increased insurance burden (9.5%) due to increasing coverage rate and 5% incentive
- The effects on cost and length of stay were not notable
- Unbundled services including high price uncovered services did not increase significantly
4. Obstacles and prospect

DRG based payment in Korea
Healthcare environment hindering case payment

- Most healthcare providers are private
- Hospitals and clinics are competing for inpatients
- Hospitals admit not only acute patients but also long term care patients
- Low price of covered services
- Low coverage rate
- The culture of utilizing health care freely
- The upgradation and diversification of consumers’ need
Strong opposition of healthcare providers

- Doctors fear that DRG case payment lower their income
  “Although case payment is higher than FFS in present, the cost containing nature of case payment will decrease doctors’ income in the future”
- Also, doctors fear that the quality of care decline under case payment
- Large hospitals, especially tertiary teaching hospitals are anxious that severe patients are transferred to them under case payment
Valid data are not available

- The data on the uncovered services are not available
  - The portion of uncovered services in total medical expenditure: 19.6% (2009 inpatients)
  - The uncovered services are not standardized, also the prices of them vary widely

- The error rates of disease codes on claims data are very high, According to HIRA survey in 2002,
  - Error rate of primary diagnoses on inpatient claims data in 3 digit: 23.6%
  - Error rate of secondary diagnoses on inpatient claims data in 3 digit: 50.6%
Low resources and support

- Lack of manpower
  - Lack of researchers
  - Lack of staffs managing case payment system
  - Lack of support of medical specialists

- Lack of organizational support
  - Specialized organization handling coding & patient classification system is needed
  - Countries introduced DRG system successfully have specialized organizations like NCCH (Australia), CIHI (Canada), DMIDI (German)
Proposal to expand KCPS in the future

- Prototype development through KCPS demonstration program
- Social agreement among insurer, providers, and insured on the payment reform: the legislation of payment reform act
- Refinement of patient classification and payment system
- Step by step introduction of KCPS with the reform of healthcare environment
Social agreement is vital

Accepting the payment reform

Increasing the price of covered services

Expanding coverage rate

Providing good quality services

Trust in providers

Increased premium

Insured (Consumer)

Healthcare Providers

Government / Insurer
5. Korean case–mix system
Korean case mix system

- Acute Inpatients
  - Korean DRG(KDRG)

- Ambulatory Patients
  - 588 Ambulatory Patient classifications
  - Korean Outpatient Group(KOPG)
  - Korean Outpatient Group-Oriental Medicine(KOPG-OM)
History of Korean DRG

- KDRG Version 1.0: developed based on HCFA-DRG (1986)
- KDRG Version 2.0: developed based on Yale RDRG (1991)
- KDRG Version 3.0: developed based on Korean cost data & clinician’s opinion (2002)
- KDRG is updated annually by HIRA
Structure of KDRG

MDC : Major Diagnostic Category
ADRG : Adjacent DRG
CC : Comorbidities & Complications
Structure of KDRG Version 3.3

- Diagnosis Code: ICD-10-KM
- Procedure Code: Korean Health Insurance Classification of Procedures in Medicine
- MDC: 23 groups
- ADRG
  - Large group: 386
  - Small group: 674
- Age group: 102 ADRGs split into 214 AADRGs (Age split ADRGs)
- CC classification: Each AADRG has 1 - 4 severity levels
- No. of Final DRGs: 1,817
588 ambulatory patient classifications

- Developed for the comparison of outpatient charge per claim
- Structures
  - 1st Step: Principal diagnosis classification - into 261 groups by middle terms of ICD-10
  - 2nd Step: Age split - child(0-17), adult(18-64), elderly(65-)
  - 3rd Step: Presence of surgical treatments
  - Final Groups: 588
Korean OPG development

- 588 APCs use only principal diagnosis to classify outpatients, so it does not differentiate the type of procedures performed in outpatient.
- In order to substitute 588 APCs, Korean OPG (Outpatient Group) development project initiated in 2003.
- KOPG is developed with the reference to American APG version 2.0.
Structure of Korean OPG

- **5 groups**
- **43 groups**
- **262 groups**

Claims

Significant procedures or Therapies

Medical Visit Indicator

No

Ancillary tests or procedures

No

ERROR KOPG

5 groups

Yes

Type of tests or procedures

No

Ancillary only KOPG

43 groups

Yes

Principal diagnosis

Medical KOPG

Age(if needed)

Medical KOPG with age split

262 groups

Yes

Type of procedures or therapies

Significant Procedure KOPG

Age(if needed)

Significant Procedure KOPG with age split

172 groups
Use of case mix system

- Accreditation of Tertiary Care Hospital
  - to evaluate inpatient case mix complexity

- Payment
  - DRG PPS for 7 disease groups

- Monitoring of Costliness Index (C.I.)
  - \( C.I. = \frac{\sum (\text{no. of patients} \times \text{real expense by KDRGs})}{\sum (\text{no. of patients} \times \text{expected expense by KDRGs})} \)
  - HIRA feedback C.I. to providers for self-regulation, and use it to determine the review rate (the higher C.I. the more claims review)
6. Monitoring system
Monitoring content

- Disease coding error, especially up-coding
- Separate FFS claims of services bundled in case payment
- DRG split
- Appropriateness of the expense of outliers
- Overcharging patient coinsurance
- Quality of care and appropriateness of hospital discharge
Outline of monitoring process

1. **Claim**
2. **Pre-check**
3. **Selection of Monitoring cases**
4. **Request copy of Medical records**

- **Review and analysis**
- **Data reception**
- **Adjustment of payment**
- **Appeal Process**
Monitoring process

◆ Selection of monitoring cases
  ■ DRG PPS for 7 disease groups : 4.7% (2010)
  ■ KCPS demonstration program : 15-40%(2011)

◆ Monitoring of quality of care
  ■ Readmission rate
  ■ Self reported checklist for improving quality of care
# Result of monitoring for 7 disease groups (2010)

[unit: %, million won]

<table>
<thead>
<tr>
<th>구분</th>
<th>Monitoring Cases</th>
<th>Adjusted Cases</th>
<th>% of adjusted no</th>
<th>% of adjusted amount</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Amount</td>
<td>No</td>
<td>Amount</td>
</tr>
<tr>
<td>Sum</td>
<td>17,748</td>
<td>9,367</td>
<td>4,174</td>
<td>181</td>
</tr>
<tr>
<td>Separate claims for services bundled in case payment</td>
<td>15,879</td>
<td>7,831</td>
<td>3,931</td>
<td>105</td>
</tr>
<tr>
<td>DRG split</td>
<td>1,556</td>
<td>1,106</td>
<td>112</td>
<td>33</td>
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<tr>
<td>FFS claim for the case that should be claimed by DRG PPS</td>
<td>313</td>
<td>429</td>
<td>131</td>
<td>43</td>
</tr>
</tbody>
</table>
Session 2

Experiences of DRG based payment in Japan and Taiwan
Experience of DRG/DPC Based Payment in Japan

2011.12.16 at HIRA. KOREA

Takashi Fukuda, Ph.D.
Center for Public Health Informatics
National Institute of Public Health
JAPAN
Topics

1. A trial of DRG Based Payment System in Japan

2. Basic Structure of DPC Based Payment System in Japan

3. Early Influence of DPC Based Payment System in Japan
A Trial of DRG Based Payment

• First introduced in 1998
• Diagnosis Related Groups (DRG) based
• Payment for Each Admission
• 183 DRGs
• Included in flat rate: room & board, medicine, diagnostic tests and imaging, etc.
• Fee for service: operation, expensive procedures
10 hospitals, mostly public
Result of the trial

• Not much influence on the average length of stay nor occupancy rate
• Too small number of DRGs, less than half patients were covered in each hospital
• In some cases, payment was very high compared to the previous fee-for-service payment

• The system was not adopted in Japan.
Study of Diagnosis Procedure Combination (DPC)

- Started in 2001
- DPC version 1: 183 groups used in the DRG trial
- DPC version 2: 532 groups; Diagnosis (ICD-10) and Procedure code (K-code)
- DPC version 3: 15 Major Diagnostic Categories (MDC)
- DPC 2003: 2552 groups
- DPC 2010: 2658 groups
- Diagnosis dominant, not procedure dominant
Implementation for Payment

- Started in April 2003
- DPC 2003: 2552 groups
- 82 special functioning hospitals
  - University Hospitals
  - National Center Hospitals
- Expanded to 1391 hospitals as of March 2010
Current DPC Based Payment System

• 1391 hospitals
• Inpatients in General Wards
• Excluded patients
  – Death within 24 hours from admission
  – Organ transplant
• 82 special functioning hospitals
  University Hospitals
  National Center Hospitals
• Expanded to 1390 hospitals as of March 2010
Diagnosis Procedure Combination

• Patient classification system based on diagnoses and major procedures
  – Major Diagnostic Categories (MDC)  18
  – Primary Diagnosis (ICD-10)          507
  – Total DPC groups                   2658
  
  DPC based payment                   1875
Major Diagnostic Categories (MDC)

- MDC1: neurology
- MDC2: ophthalmology
- MDC3: otorhinolaryngology
- MDC4: respiratory
- MDC5: circulatory
- MDC6: digestive, gastroenterology
- MDC7: muscle-skeleton
- MDC8: dermatology
- MDC9: breast
- MDC10: endocrine
- MDC11: genitourinary
- MDC12: perinatal
- MDC13: blood, blood-forming organs
- MDC14: neonatal
- MDC15: pediatrics
- MDC16: trauma, burn
- MDC17: mental
- MDC18: other
DPC Based Payment

• Included in per diem flat rate
  – basic inpatient fee (room & board + regular nursing care), laboratory tests, diagnostic imaging, medication, low cost procedures (less than 10000 yen per procedure)

• Fee for service payment
  – surgery, anesthesia, endoscope, pathology, rehabilitation, etc.
Example: Appendicitis

- MDC6: digestive system
- Primary Diagnosis: appendicitis (code 060150)
- Major Procedure: appendectomy
- Complications: no
- Key Dates
  - Hospital Day 1 (25 percentile of length of stay): 3 days
  - Hospital Day 2 (average length of stay): 6 days
  - Hospital Day 3 (average length of stay + 2SD): 11 days
- Payment
  - Admission-Day1(1-3 day): 34820 yen per day
  - Day1 – Day2(4-6 day): 20950 yen per day
  - Day2 – Day3(7-11 day): 17810 yen per day
  - After Day3: fee for service payment
- Fees for surgery and anesthesia are paid separately
## Example: Appendicitis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Surgery</th>
<th>Complication</th>
<th>Key dates</th>
<th>Payment (JPY) per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 2 3</td>
<td>Adm-Day1   Day1-Day2 Day2-Day3</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>No</td>
<td>No</td>
<td>3 5 10</td>
<td>31420      21180     18000</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>No</td>
<td>Yes</td>
<td>5 9 18</td>
<td>31200      22040     18730</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Other surgery</td>
<td></td>
<td>7 14 27</td>
<td>30800      22760     19350</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Appndectomy</td>
<td>No</td>
<td>3 6 11</td>
<td>34820      20950     17810</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Appndectomy</td>
<td>Yes</td>
<td>6 11 23</td>
<td>31420      22400     19040</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Colonectomy</td>
<td></td>
<td>8 15 28</td>
<td>32270      20730     17620</td>
</tr>
</tbody>
</table>

* Complication: ileus, diabetes, other complications related to surgery
How were the payment rates determined?

- Average payment per day in the DPC group
  - Day 1: A, 15%
  - Day 2: B
  - Day 3: 15%

FFS
Payment Adjustment for Each Hospital

• Firstly introduced in 2003, so that average payment would be equal to the previous year
• Each hospital has own adjustment factor, and actual payment is calculated by (average payment rate)x(adjustment factor of each hospital)
• As a result, payment of each hospital is not unified. It is a new concept in Japan.

• However, there is a strong argument if we should keep the payment of previous year.
Change of Payment Adjustment Factor

• Current adjustment factor will be terminated in the future.
• New adjustment factor based on hospital functions is proposed.
  – Efficiency indicator
    • based on average length of stay compared to other DPC hospitals
  – Complex indicator
    • based on payment of one hospitalization among DPC hospitals
  – Coverage indicator
    • based on the number of DPC groups in each hospital
  – Emergency care indicator
    • based on early procedures of emergency care
  – Contribution to community health indicator
    • based on the points attributed to community health, such as cancer registration, disaster medicine, perinatal care center, etc.

• Partly applied from 2010
An Early Study on Influence of DPC Based Payment System

• **Subject**
  – 82 special functioning hospitals

• **Data**
  – fee for service payment equivalent data
  – Discharged patients: 2002.7-10 266,677 cases
    2003.7-10 293,045 cases

• **Analytical unit**
  – DPC groups for 2003
  – Number of hospital >5, whose patients in each DPC group>10
  – DPC groups with surgery : 88 groups
  – DPC groups without surgery : 80 groups
  – DPC groups for diagnostic testing: 18 groups

• **Payment**
  – Inclusive in the flat rate
  – Fee for service
Hypotheses

- No incentive to reduce the length of stay because the payment was per diem bases
- The number of procedures under the flat rate payment would reduce, however, those under fee for service would not.
- More influential on DPC groups without surgery because most of the procedures were under the flat rate payment
Average Length of Stay

NetLOS without surgery groups

NetLOS with surgery groups

NetLOS testing groups

% change from 2002
Procedures under Fee For Service Payment

with surgery groups

% change from 2002
Procedures under Flat Rate Payment

- without surgery groups
- with surgery groups
- testing groups

Number of DPC groups

cDPC % change from 2002
Procedures of Diagnostic Testing and Imaging

% change from 2002

cDIAG

without surgery groups

with surgery groups
Procedures of Medication

- without surgery groups
- with surgery groups

% change from 2002

Number of DPC groups
Findings

• Average length of stay was reduced in most DPC groups. Because,
  – Clear comparison among DPC hospitals
  – Improve bed turnover rate in order to do more surgeries
  – Standardization of the inpatient care, such as clinical pathway method
  – Some procedures, such as diagnostic imaging before surgery, were performed before hospitalization
• The number of procedures under the flat rate payment reduced, however, those under fee for service did not.
  – consistent with economic incentives under DPC payment
• More influential on DPC groups without surgery compared to groups with surgery
  – consistent with economic incentives under DPC payment
• More influential on medication compared to diagnostic procedures
  – many alternatives (generics, inexpensive drugs) for medication
Implications

• Japanese DPC based payment system contributed to clear understanding of procedures for acute inpatient care.

• Flat rate payment system reduced procedures and moved to lower cost medicines.

• However, outpatient services, not just inpatient procedures, must be investigated in order to evaluate the whole influence.
Information Infrastructure supporting DPC/PDPS in Japan

Koichi B. Ishikawa, Ph.D
Center for Cancer Control and Information Services,
National Cancer Center, JAPAN
Key terms and abbreviations

- **DPC**: Diagnosis Procedure Combination
  - Case mix classification based on ICD10 and clinical interventions
  - 18 MDCs, 507 diagnostic categories, 2,658 payment groups, 1,875 (71%) paid by PDPS

- **PDPS**: Per Diem Payment System
  - Payment method, three-stage fee per day set by LOS (25%, mean, mean+2SD)
  - Unbundled services: Surgery, Anesthesia, Pathology, etc.
  - Bundled services: inpatient stays, diagnostic tests, radiology, pharmaceuticals, supplies

- **MHLW**: Ministry of Health Labor and Welfare

- **“Study group”**: MHLW funded research group
  - Started in 2001 (2 years prior to introduction of DPC/PDPS), currently in 4th term
  - Approx. 1,000 hospitals participate in data collection, 4.7 million discharges / 9 months
DPC/PDPS: Ecosystem for Acute Hospital Care

- DPC/PDPS is **NOT** just a payment method
- Intended to **build a national information infrastructure** for data accumulation and analysis
  - Shortcomings of Japanese electronic claims data
    - data format inherits paper forms, difficulty in transforming data into analysis-friendly format
    - missing temporal information (submission by month, no dates)
  - “DPC Survey” data is used to overcome above issues
- **Emphasis on PROCESS** of care
  - DPC is designed / refined based on process of care, then grouped by similarity of costs
  - Data analysis focuses on process/variation of care
Background: Claims processing

1. **Claim**
   - month+1, day 10

2. **Review**
   - month+1, day 10-25

3. **Claim**
   - month+2, day 10

4. **Payment**
   - month+2, day 20

5. **Payment**
   - month+2, day 21

**Providers**
- Hospitals
- Clinics
- Pharmacies

**Claims Review and Reimbursement Organizations**

**SHIHARAI-KIKIN**
- Health Insurance Claims Review & Reimbursement Services
  - 47 offices

**KOKUHO RENGO-KAI**
- (All-Japan) Federation of National Health Insurance Organizations
  - 47 unions

**Insurers (payers)**

**KENPO KUMIAI, etc.**
- Employee’s Insurance
  - “Kyokai” (1 / 34mil.)
  - “Kumiai” (1,500 / 28mil.)
  - “Kyosai” (76 / 9mil.)
  - 71 million

**KOKUHO KUMIAI**
- National Health Insurance Organizations (2,000)
  - 42 million

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Providers

SHIHARAI-KIKIN
Health Insurance Claims Review & Reimbursement Services

- Computerized check
  - Computerized check
  - Staff review
    - Staff review
    - Committee member review
  - Review committee decision

Insurers (payers)

- Review & decision

Claims review, quality assurance and refinement

Review Areas (FFS)

- Formalities
- Interventions
- Pharmaceuticals
- Medical supplies

DPC/PDPS claims review

DPC coding review based on
diagnosis, data on unbundled services,
supplemental data on bundled services

Unbundled services review based on
FSS rules

Monitoring and other activities

Performed by MHLW,
via DPC Survey + Study group
1) under-utilization of services
2) premature discharges and re-admissions
3) other issues related to quality of care
   ↓
4) assessment on the effects of DPC/PDPS
   ↓
5) variations among hospitals
6) variations within DPC
7) payment adjustment methods
case mix index
hospital profile / classification
   ↓
Refinement of DPC/PDPS

+ above aspects

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Information flow

Note:
• Independent data collection by the study group,
• same data format
• + outpatient process
# DPC Survey: Hospitals and Discharges

<table>
<thead>
<tr>
<th>Year</th>
<th>Period / Months</th>
<th>Hospitals DPC paid</th>
<th>FFS paid</th>
<th>Total</th>
<th>Discharges (in millions)</th>
<th>Annual (12mo.)</th>
<th>Named Data</th>
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**Percentage to all general Hospitals (2010)**

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<tr>
<th>Category</th>
<th>17.9%</th>
<th>3.6%</th>
<th>21.5%</th>
<th>(7,714)</th>
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<td>Hospitals</td>
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<tr>
<td>Beds</td>
<td>50.4%</td>
<td>4.7%</td>
<td>55.1%</td>
<td>(90.9)</td>
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<tr>
<td>Number of beds</td>
<td>45.8</td>
<td>4.3%</td>
<td>50.1%</td>
<td></td>
</tr>
</tbody>
</table>

• DPC survey covers 62% of discharges from general hospitals (14.5 million / 2010)

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DPC Survey: Data collection

- Discharge SUMMARY: “FF1 (File Format 1)”
  - basis for coding DPC classification

- Data on clinical PROCESS: “E/F file”
  - basis for pricing PDPS fees by DPC
    - elaborate list of services provided to inpatient
    - comparable to FFS claims, but uses different file format

- Data on hospital STRUCTURE: “FF3 (File Format 3)”
  - basis for classifying hospitals and used in payment adjustment
    - qualifications on staffing, facility and management processes

• Note:
  - Patient ID is not nationally standardized.
  - Data is linked by hospital–proprietary ID’s.
DPC Survey: Discharge Summary (FF1) Items

- **Hospital**: ID
- **Patient**: ID, sex, birthday, zip code
- **Admission**: dates, referral, emergency/ambulance, death within 24 hours of admission
- **Diagnosis**: text, ICD10 codes
- **Surgery**: dates, procedure names/codes
- **Other clinical data**: Pregnancy, birth weight, height, weight, smoking, clinical staging/severity (UICC–TNM, etc.)
**DPC Survey: Process Data (E/F files)**

### E/ファイル＜診療明細情報＞

<table>
<thead>
<tr>
<th>番号</th>
<th>必要</th>
<th>データエレメント</th>
<th>統計数</th>
<th>統計指数</th>
<th>前世の必須</th>
<th>説明</th>
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<td>○</td>
<td>入院年月日（西暦）</td>
<td>8</td>
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### F/ファイル＜診療明細情報＞

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<td>○</td>
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(注) 1. 部門のとりめる診療部門は、1年ごとに診療コードを更新、2日目12時の更新点となる
(注) 2. 統計数はコメントデータを除いた（最低コードとして診療できない場合）
(注) 3. 統計指数は、1日あたりコンセントコード（最低コードとして診療できない場合）
(注) 4. 統計数は、1日あたりコンセントコード（最低コードとして診療できない場合）
(注) 5. 統計数は、1日あたりコンセントコード（最低コードとして診療できない場合）
(注) 6. 統計数は、1日あたりコンセントコード（最低コードとして診療できない場合）

*lishikaw@ncc.go.jp / 20121216 / HIRA / Information Infrastructure supporting DPC/PDPS in Japan*
DPC Survey: Publication of results

- Publicly available via website
  - 2010 Survey results (in Japanese)
    http://www.mhlw.go.jp/stf/shingi/2r9852000001u23a.html

- Focuses on
  - **Case group summary**: for DPC payment categories
  - **Oncology regimens**: combination of chemotherapeutic drugs
    - costly-drugs bundled in PDPS, by DPC6(diagnosis)
  - **Hospital performance**: case mix, volume and LOS
    - by MDC, DPC6(diagnosis), DPC6+interventions
    - route of admission (including emergency, ambulance) / discharge
    - case mix indexes, outcome at discharge, etc.
  - **Readmission / transfers to special inpatient wards**
    - monitoring of premature discharges, repeated admissions

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大腸（上行結腸からS状結腸）の悪性腫瘍
手術なし 手術・処置等2 5あり

| MDC06 | 消化器系疾患、肝臓・胆道・肺臓疾患 | 当該MDCに含まれるDPCの数 | 451 | 当該MDCの症例数 | 1008467 |

| DPC | volume | sex | age | admission | outcome | LOS |

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- kishikaw@ncc.go.jp / 20121216 / HIRA / Information Infrastructure supporting DPC/PDPS in Japan
### Case group summary

- **kishikaw@ncc.go.jp / 20121216 / HIRA / Information Infrastructure supporting DPC/PDPS in Japan**

#### Main Dx and CC

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#### Surgery

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#### Additional interventions

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**Note:** The table contains data related to specific medical conditions and procedures, including diagnoses, interventions, and additional procedures. The percentages and counts indicate the frequency and distribution within the dataset.
### Colon cancer (060035) MHLW DPC Survey results (2009)

- No surgery (99), with chemotherapy (5/4/3)

#### Surgery and Procedures (2)

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<th>Procedure</th>
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<tr>
<td>4: FOLFOX</td>
<td>060035xx99x4xx</td>
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<tr>
<td>3: other chemotherapy, without radiation therapy</td>
<td>060035xx99x3xx</td>
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#### Statistics

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<td>77.80%</td>
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<td>patients over 80</td>
<td>5.04%</td>
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<tr>
<td>Male</td>
<td>53.89%</td>
<td>57.28%</td>
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<td>Mortality at discharge</td>
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<td>LOS (mean)</td>
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<td>LOS percentiles 90</td>
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<td>6</td>
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</table>

#### Bevacizumab use

- Under 60: 62%
- Over 60: 54%
- Over 80: 40%

---

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Chemotherapy regimens for colon cancer

MHLW DPC Survey(2009)

- FOLFOX→56%
- FOLFIRI→29%
- 80% of hospitals using standard regimens?
- 53% of hospitals
- Reasons for not using standard regimens?
Hospital performance:
Volume and LOS

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</table>

DPC 2008 classifications for surgery→
01 total resection
02 partial resection
03 exploratory laparotomy
04 EMR, ESD

• kishikaw@ncc.go.jp / 20121216 / HIRA / Information Infrastructure supporting DPC/PDPS in Japan
Contribution by the study group

Research and Development of

- DPC classification
- Solutions for problematic areas in PDPS fee setting
  - appraisal of hospital variations and functionality, intensity of care
  - variations in LOS, use of costly drugs
- Data analysis methodology, reporting of data
- Collection and analysis of outpatient data
- Other applied use of DPC data
  - Extensions to clinical studies and registries
  - Geographic studies
    - provider distribution and accessibility, contribution to community, regional healthcare planning

Education sessions for hospitals, local authorities

- Study group is needed in absence of a unified payer / claims operator to collaborate with MHLW
DPC/PDPS for optimization in NHI
(in current Japanese health care context)

- **Pursuit in prospective payment**
  - containment of costs through bundling of healthcare fees
  - monitoring of readmissions and other adverse events

... may result in suboptimization of acute hospital care costs

- **Approaches to achieve total optimization**
  - **Management of acute hospital care via DPC/PDPS**
    - accumulate explicit knowledge on case mix, volume and providers
    - calculate total budget related to DPC/PDPS providers (acute care)
    - manage geographic distribution and accessibility
  - **Differentiation/segmentation of post-acute care**
    - expand DPC classification to categorize services (including outpatient services)
      
      → extend management over non-acute care settings
Keys to success

- Rich process data is vital
  - Enables direct estimation of service volume, and hence, costs

- Bundled services
  - Maintain uniform pricing of pharmaceuticals, supplies
    - Perform market-price surveys to keep adequacy of prices

- Unbundled services
  - Elaborate in doctor-fee (interventions) pricing
    - Helps refining of case mix classifications
    - Always link interventions to person-hours of labor
      → ceiling for growth in practice volume

- Dialogue between providers, payers, patients
  - Construct and mobilize “value-chain” in healthcare

• Data and case mix classification are the key elements.
• PPS is one tool for cost containment in reimbursement, but its success depends largely on outlying activities.
DPC/PDPS based payment in Japan

Koichi Benjamin Ishikawa, PhD
National Cancer Center

Takashi Fukuda, PhD.
National Institute of Public Health
Key components of DPC/PDPS

- **Patient classification system:** DPC
  - DPC = Diagnosis Procedure Combination

- **Standardized data collection → DPC Survey database**
  - **Structure**
    - “FF3 (File Format 3)”
  - **Patient**
    - discharge Summary
      - “FF1 (File Format 1)”
  - **Process**
    - FFS–based listing of daily services
      - “E/F files”
  - **Fees**
    - DPC/PDPS–based listing of daily charges
      - “D file”

- **Payment rules and fees:** PDPS
  - PDPS = Per Diem Payment System
  - **Unbundled services**
  - **FFS–based fees** + [(sum of PDPS Fee for day) x (adjustment)]
  - **Bundled services**
Patient classification system: DPC

- **Diagnosis Procedure Combination**

- **14-digit code**, by diagnosis, interventions and clinical attributes
  - **First 6-digits**: Diagnosis (single most resource consuming)
    - Top 2-digits: MDC (Major Diagnosis Category)
      - grouped by organ systems, clinical areas
    - Second 4-digits:
      - grouped by diagnosis (ICD10 codes)
  - **Last 8-digits**: interventions/tests, CC/severity, etc.
    - main surgery (2), other procedures and tests (1+1),
      age/birth weight etc. (1), comorbidity and complications (1), severity (1),
      purpose of admission (1, not currently used)

- **Detailed clinical groups** → aggregated payment groups
  - tens of thousands
    - 2,658 (ver. 7, 2010)
## Changes in number of DPC payment groups

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<th>2008 (Ver. 6 / H20)</th>
<th>2006 (Ver. 5 / H18)</th>
<th>2004 (Ver. 4 / H16)</th>
<th>2003 (Ver. 3** / H15)</th>
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</tr>
<tr>
<td>Paid by FFS</td>
<td>783 (778)</td>
<td>879</td>
<td>909</td>
<td>1,357</td>
<td>692</td>
</tr>
<tr>
<td>% of DPC paid groups</td>
<td>70.5% (70.7%)</td>
<td>64.1%</td>
<td>61.3%</td>
<td>55.9%</td>
<td>72.9%</td>
</tr>
<tr>
<td><strong>MDC</strong></td>
<td>18</td>
<td>18</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td><strong>DPC6(diagnosis)</strong></td>
<td>507</td>
<td>506</td>
<td>516</td>
<td>591</td>
<td>575</td>
</tr>
</tbody>
</table>

* minor revision in June, initial April version shown in ()
** 2 prior trial versions exist (DRG/PPS based)
DPC classification Tree

Lung cancer (040040)

Dx (DPC6)

Surgery

Other procedures

- Lung cancer (040040)
- Dx (DPC6)
- Surgery
- Other procedures

- C33 気管支の悪性 新生物
- C34 気管支 および肺の 悪性新生物
- C780 肺の統発性 悪性新生物
- D021 気管の上皮 内癌
- D022 気管支 および肺の 上皮内癌
- D024 呼吸器系の 上皮内癌、 部位不明
- K514$ 肺恶性腫瘍手術
- surgical resection
- K510気管支腫瘍摘出術(気管支鏡またはファイバースコープによるもの)など含む
- misc. surgery

- chemotherapy
Payment by DPC/PDPS

- **Unbundled services (physician fees)**
  - surgery/anesthesia (including pharmaceuticals and supplies)
  - other costly procedures (JPY10,000+)
  - selected tests and services:
    - cardiology catheter tests, endoscopy, pathology, rehabilitation, psychology and other services by physicians

- **Bundled services (hospital fees)**
  - fees related to inpatient stay
  - medication fees (including pharmaceuticals) and supplies
  - medical tests (lab, radiology, physiology)
  - minor procedures
  - (sum of PDPS Fee for day) x (adjustment)
    - three-stage fee per day for DPC14 payment group
      - reduced for prolonged stays
    - adjustment by hospital functionality
  
  roughly 40%
Lung cancer, no surgery, + chemotherapy

<table>
<thead>
<tr>
<th>Days to</th>
<th>period</th>
<th>period</th>
<th>period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>JPY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>34,720</td>
<td>25,020</td>
<td>21,270</td>
<td></td>
</tr>
</tbody>
</table>

Period II is set based on average length of stay

Example:

<table>
<thead>
<tr>
<th>period</th>
<th>period</th>
<th>period</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>admission</td>
<td>34,720 × 8</td>
<td>25,020 × 2</td>
<td>277,760</td>
</tr>
<tr>
<td>25,020</td>
<td>50,040</td>
<td>327,800</td>
<td></td>
</tr>
</tbody>
</table>

4,917,000KRW @ 15KRW = 1 JPY
124,564TWD @ 0.38TWD = 1 JPY
4,261 USD @ 0.013 USD = 1 JPY
Lung cancer, no surgery, + chemotherapy

- fee for day is reduced in three stages
  - 25th percentile
  - average LOS
  - LOS+2SD’s
肺がん/カルボプラチン+パクリタキセルあり

25th percentile at day 3

average LOS at day 5

period III at day 10

Ovary: 120010 x x 99 x 5 0 x

• inpatient chemotherapy
• with carboplatin + paclitaxel
• for cancers in ovary, lung
• (drug cost=15-18,000 points)

Lung: 040040 x x 99 0 5 x x

20,000 points in 5+ days
**Lung cancer DPC payment groups**
by oncology regimen, days and points of PDPS fee schedule

<table>
<thead>
<tr>
<th>DPC14 codes</th>
<th>040040 xx9904xx</th>
<th>040040 xx9905xx</th>
<th>040040 xx9906xx</th>
<th>040040 xx9907xx</th>
</tr>
</thead>
<tbody>
<tr>
<td>regimen</td>
<td>Other regimens</td>
<td>Carboplatin + Paclitaxel</td>
<td>With Pemetrexed</td>
<td>With Bevacizumab</td>
</tr>
<tr>
<td>days</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period I</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>FFS</td>
</tr>
<tr>
<td>Period II</td>
<td>15</td>
<td>19</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Period III</td>
<td>34</td>
<td>44</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>points</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period I</td>
<td>3,472</td>
<td>3,876</td>
<td>7,734</td>
<td></td>
</tr>
<tr>
<td>Period II</td>
<td>2,502</td>
<td>2,915</td>
<td>5,842</td>
<td></td>
</tr>
<tr>
<td>Period III</td>
<td>2,127</td>
<td>2,478</td>
<td>4,966</td>
<td></td>
</tr>
</tbody>
</table>

\[\text{kishikaw@ncc.go.jp & t-fukuda@niph.go.jp / 20121216 / HIRA / Information Introduction of DPC/PDPS in Japan}\]
## Adjustment of payment

### type 2 adjustment: specific to DPC/PDPS

<table>
<thead>
<tr>
<th>Mission</th>
<th>Performance, functionality and social needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>data</strong></td>
<td>participation to DPC Survey, quality of data</td>
</tr>
<tr>
<td><strong>efficiency</strong></td>
<td>reduction in LOS</td>
</tr>
<tr>
<td><strong>complexity</strong></td>
<td>reception of longer LOS patients (severe cases)</td>
</tr>
<tr>
<td><strong>coverage</strong></td>
<td>of case mix classification (number of DPC14’s)</td>
</tr>
<tr>
<td><strong>community</strong></td>
<td>responsibility and contribution to requirements</td>
</tr>
<tr>
<td><strong>emergency</strong></td>
<td>structure and volume of emergency services</td>
</tr>
</tbody>
</table>

### type 1 adjustment: differences in structure and performance available in FFS

- **fundamental adjustment by hospital category**
- **university hospitals**
- **high performance hospitals** (similar to university hospitals)
- **other hospitals**

### hospital profile

(hospital profile planned to be introduced in April, 2012)

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*kishikaw@ncc.go.jp & t-fukuda@niph.go.jp / 20121216 / HIRA / Information Introduction of DPC/PDPS in Japan*