



International Actuarial Association Health Section
2007 Colloquium

13th - 16th May 2007 Cape Town, South Africa

INDEXATION OF MEDICAL COSTS FOR SOUTH AFRICAN MEDICAL SCHEMES

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IAAHS 2007

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CTICC

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Objectives

- Index for private sector medical prices
- Experienced by members of a particular set of medical schemes
- In respect of claims submitted for reimbursement
- Opportunities for expansion

Ideal index characteristics

- Representative
- Objective
- Consistent
- Smooth
- Ease of understanding (and calculation)

MPI

Inflation is defined as the persistent change in the general price level

The intention of the index is to track the changes in the price of medical services over time in an objective way.

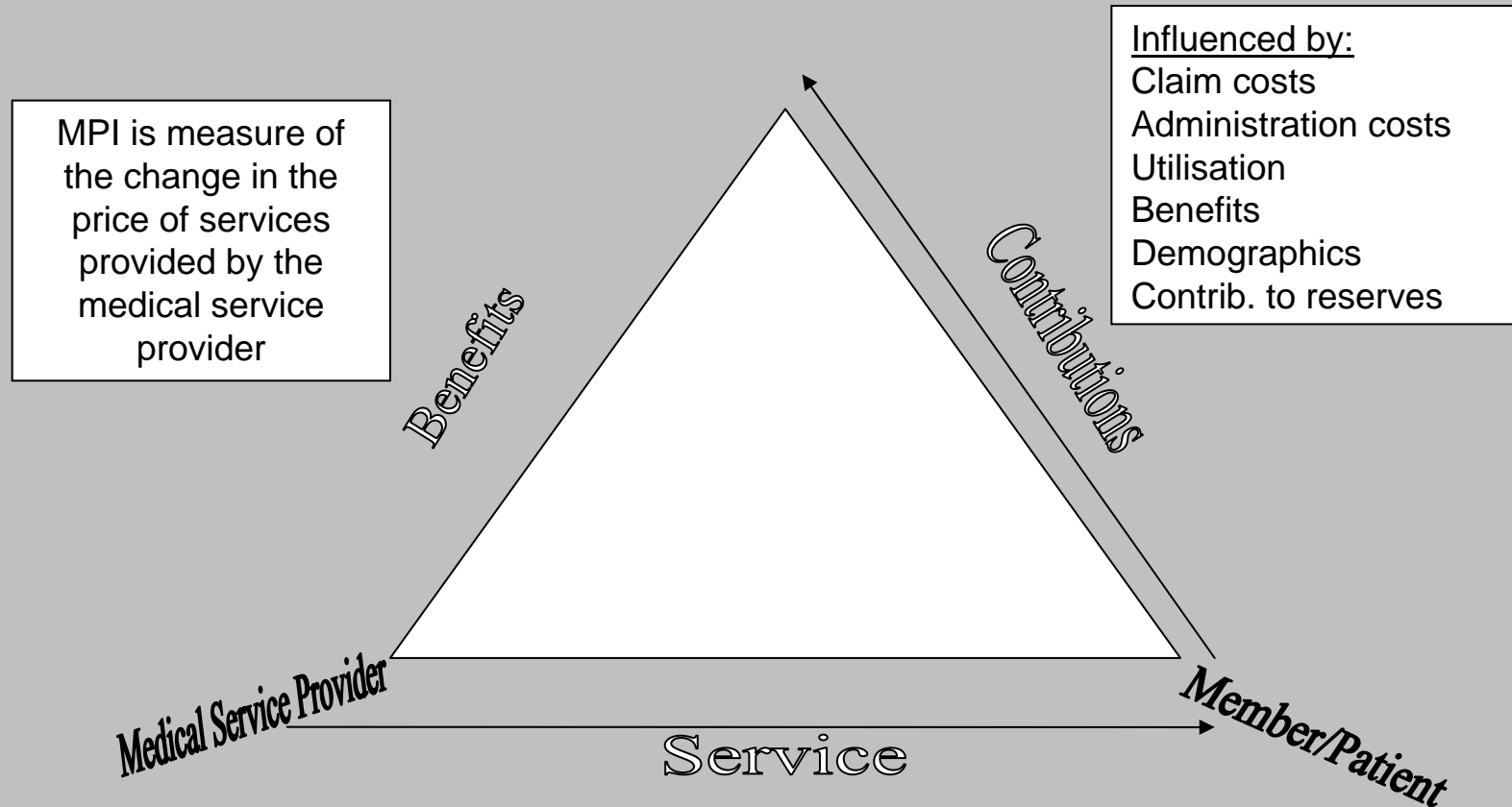
Currently available measures

- Contribution increases
 - Per scheme
 - Report of the Registrar
- CPI
 - Medical care and health expenses

Medical Scheme Contributions

- Used as proxy for medical costs
- But includes:
 - Non-healthcare costs
 - Reserving requirements
 - Utilisation trends
 - Impacts of benefit changes
 - Impacts of demographic changes

Medical scheme interactions



Index development

- Measuring performance / effects
- Monitoring growth
- Benchmarks
- Identification of problem areas

Price indices

- **LASPEYRES INDEX**

$$\text{Index} = \frac{\sum (P_{it}Q_{io})}{\sum (P_{io}Q_{io})}$$

Where

P_{it} = Price of item i ($i = 1, \dots, m$) in period t

P_{io} = Price of item i ($i = 1, \dots, m$) in the base period

Q_{io} = Quantity of item i purchased in the base period

Price indices

- **PAASCHE INDEX**

$$\text{Index} = \frac{\sum (P_{it}Q_{it})}{\sum (P_{io}Q_{it})}$$

Where

P_{it} = Price of item i ($i = 1, \dots, m$) in period t

P_{io} = Price of item i ($i = 1, \dots, m$) in the base period

Q_{it} = Quantity of item i purchased in period t

Calculation process

- Household surveys (quantities)
- Price surveys
- Development of representative baskets
- Aggregation of baskets
 - Items to include
 - Substitution
- Weight allocations (within and between)
- Index calculation

Sources of bias

- Substitution
- Outlet substitution
- Quality change
- New product

(Boskin Commission, 1995)

ILO Manual

- Use of formulae
- Frequency and completeness of surveys
- Sampling methods
- Quality adjustment
- Relevance to sub populations
- Differing objectives

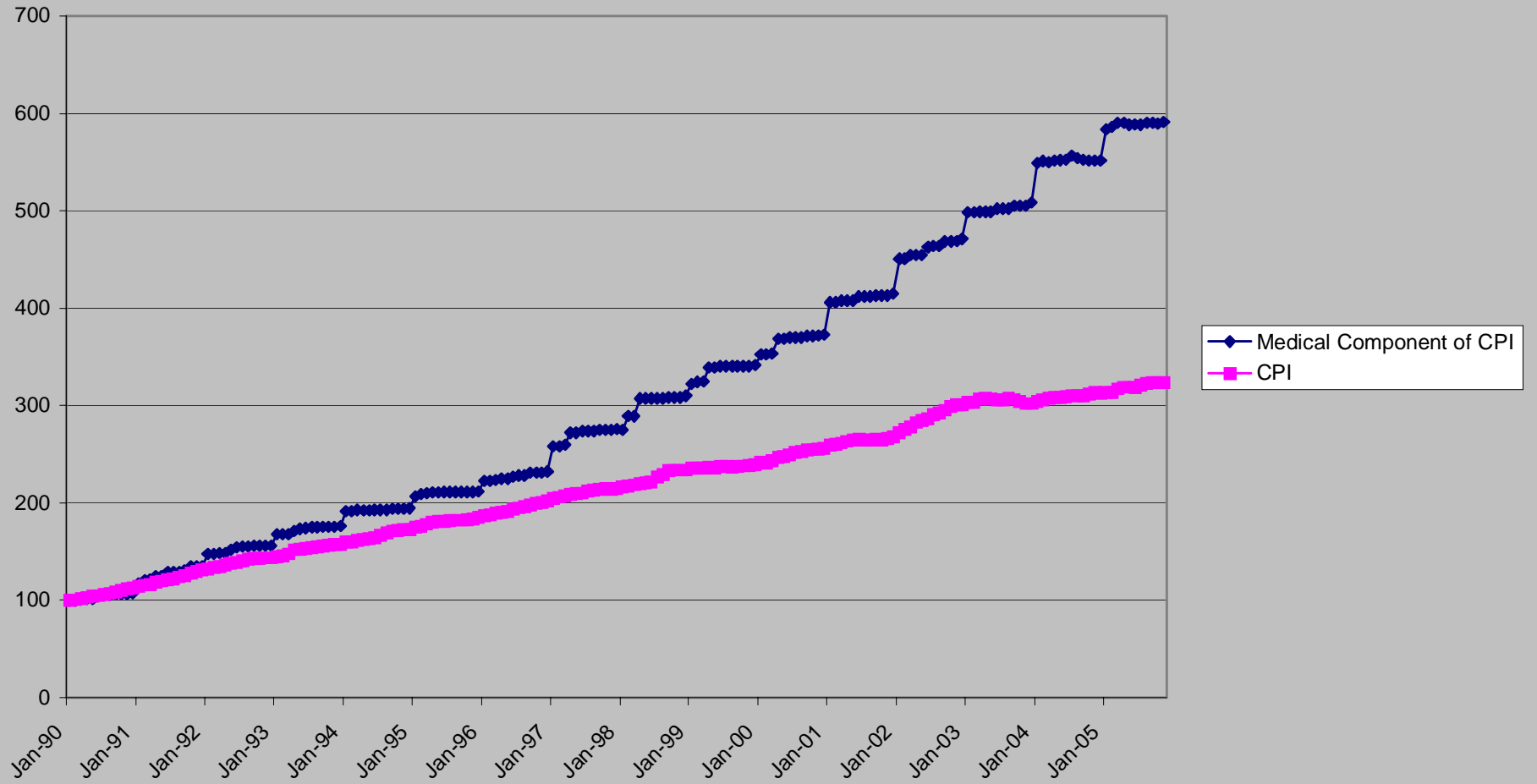
South African CPI

- CPI
- Core
- CPIx
- Inflation targeting
- Weights based on 2000 household survey
- 17 groups incl. medical care and health expenses

Medical care and health expenses

	% weighting CPI	% of Medical Component of CPI basket
Doctors fees, nurses fees and fee for related services	2.29%	32%
Hospital, nursing-home fees and fee for related services	0.64%	9%
Medical and pharmaceutical products	2.61%	37%
Therapeutic appliances and equipment	0.16%	2%
Contributions to medical aid funds	0.98%	14%
Insurance	0.47%	7%
Total: Medical care and health expenses	7.15%	100%

Chart of Medical Component of CPI and CPI (Base = 1990)
for January 1990 to November 2005



Pilot study

- Medical schemes administered by sponsor
- Service dates: 1 Jan 2001 to 30 Nov 2005
- Claim extracts:
 - Hospital;
 - Medicine; and
 - Other (all remaining services providers and claim types).

MPI

- Private sector measure
- Calculated from medical scheme data
- Claim amounts (not tariff)
- Extensive baskets of products and services
- All items measured monthly
- Adjustments for changing practice

Data issues

- Tariff coding
 - NHRPL
 - NAPPI
- Internal codes
- Hospital consumables
- Frequency definition

Basket Construction

Basket	2001	2002	2003	2004	2005
Hospitals	79%	74%	56%	73%	71%
Medicine Chronic	58%	58%	58%	58%	58%
Medicine Acute	69%	69%	69%	69%	69%
Anaesthetist	81%	81%	82%	82%	82%
Consulting Specialist	74%	72%	72%	73%	72%
Dentistry	55%	65%	61%	58%	54%
General Practitioners	76%	78%	76%	77%	80%
Obstetrics & Gynae	77%	73%	74%	74%	76%
Optometry	66%	64%	63%	61%	64%
Pathology	69%	69%	70%	70%	71%
Procedural - Specialist	50%	47%	50%	49%	51%
Radiology	48%	52%	52%	63%	57%

MPI calculation

- At per category level and overall
- $h(n)$ = hits weighting used in month n
- $p(n)$ = price in month n
- $M(n) = [\text{sumproduct}(h(n),p(n))] / \text{sum}(h(n))$
- $\text{Index}(n) = [M(n) / M(n-1)] * 100$

Linking methodology

- In transition month:
 - $A = \text{Weights}(1) * \text{cost per hit}$
 - $B = \text{Weights}(2) * \text{cost per hit}$
- Index in transition month = $A/\text{prior month}$
- Index in transition month + 1 = following month/B

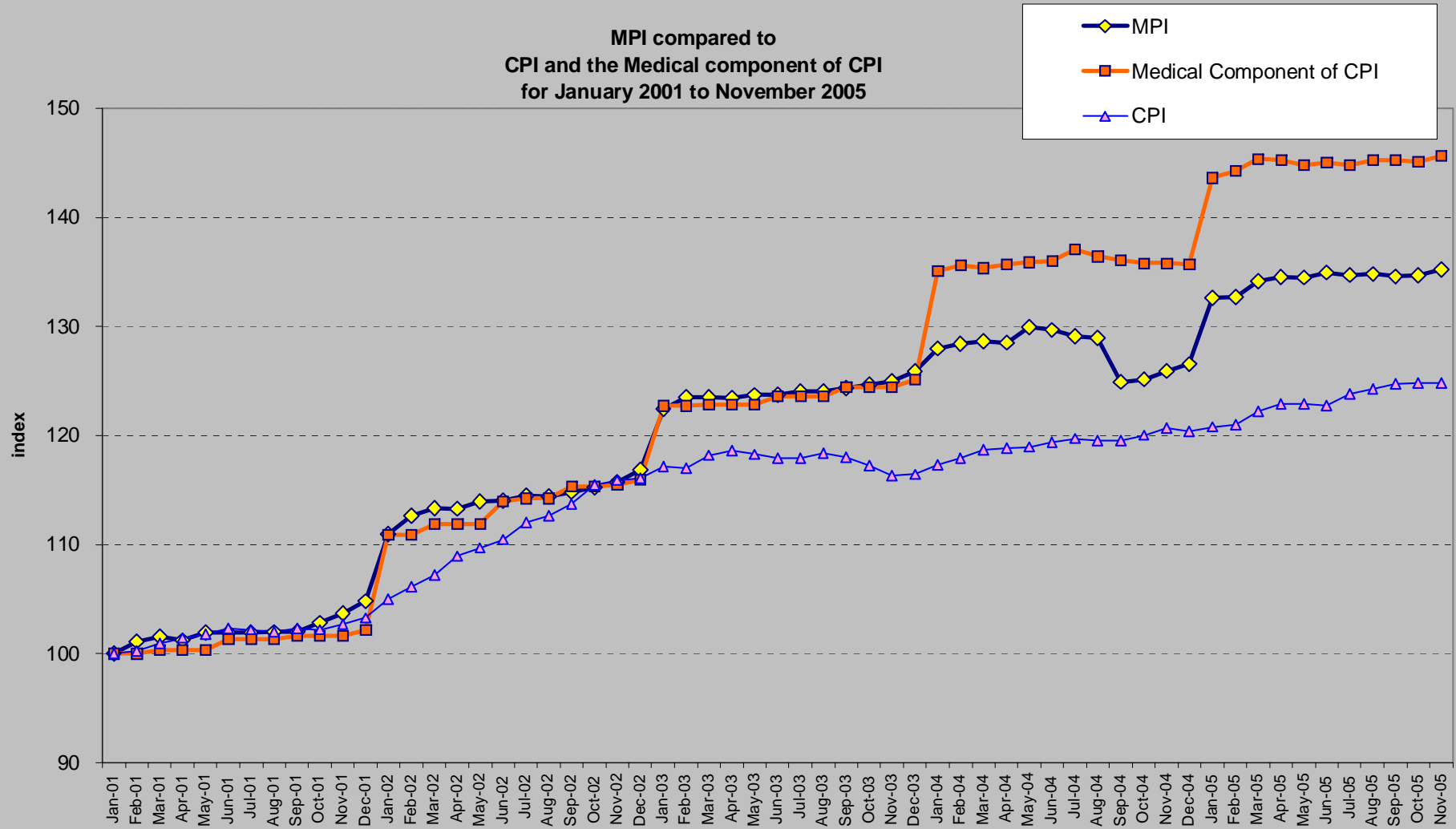
Weightings

MPI Components	Index weight				
	2005	2004	2003	2002	2001
General Practitioners	8%	8%	8%	10%	10%
Specialists	25%	25%	25%	25%	24%
Hospitals	30%	31%	30%	28%	29%
Medicine	26%	25%	25%	26%	26%
Other	11%	11%	11%	11%	10%
Totals	100%	100%	100%	100%	100%

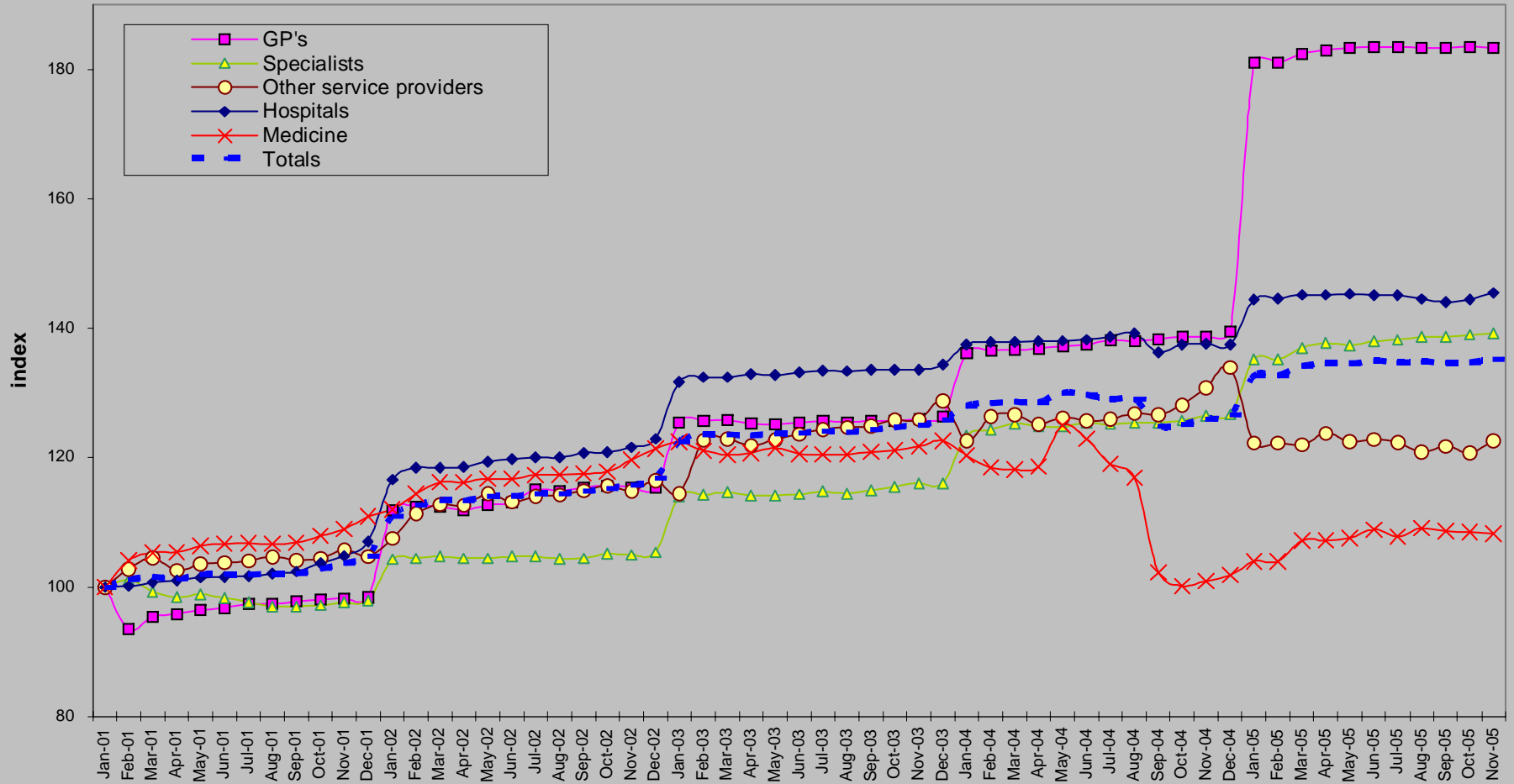
Comparison to CPI

At November 2004	MPI	Medical component of CPI
General Practitioners	14%	33%
Specialists	28%	
Other providers	13%	
Hospitals	9%	9%
Medicines	36%	37%
Contributions to medical aid funds	Not included	14%
Insurance	Not included	7%

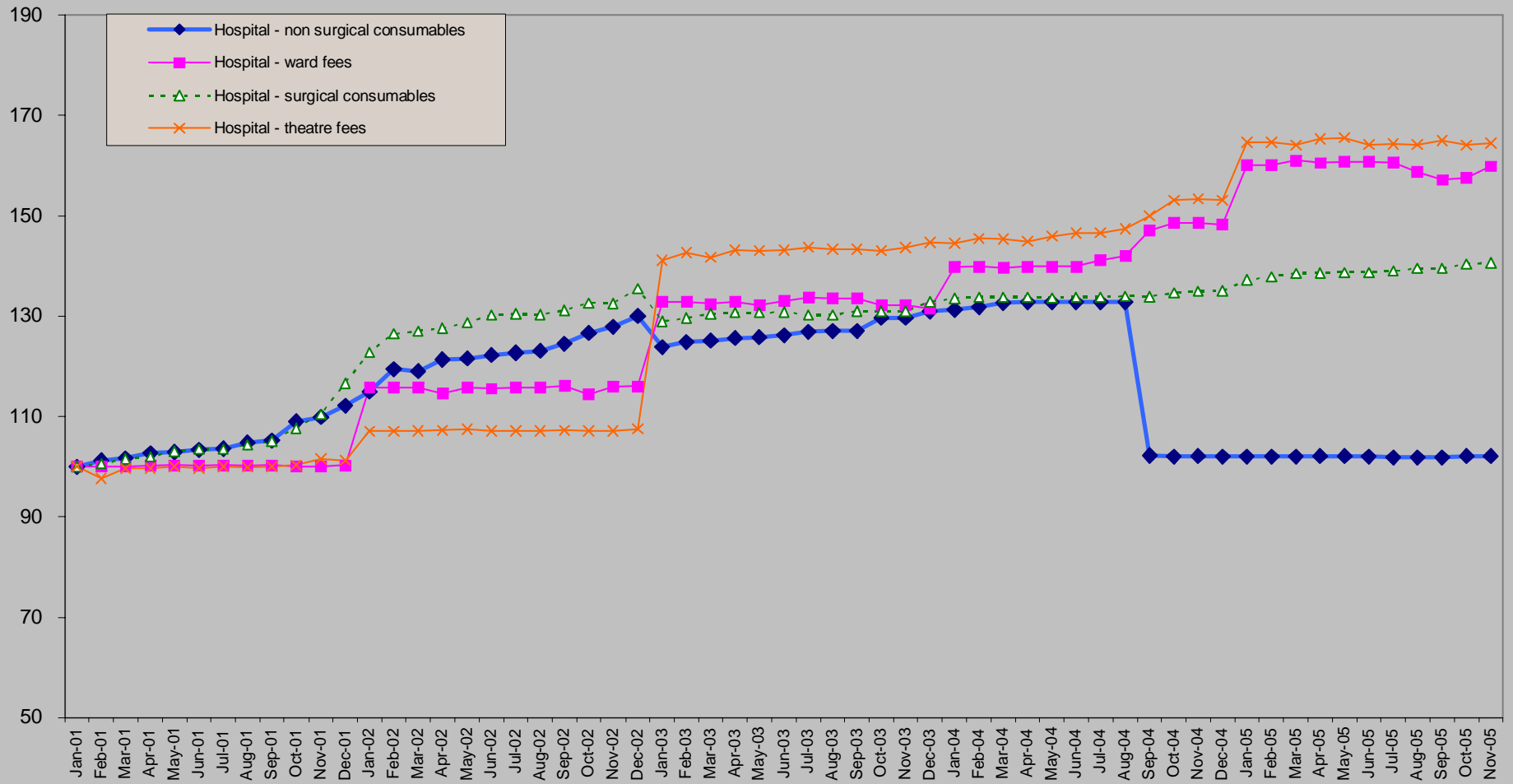
MPI compared to
CPI and the Medical component of CPI
for January 2001 to November 2005



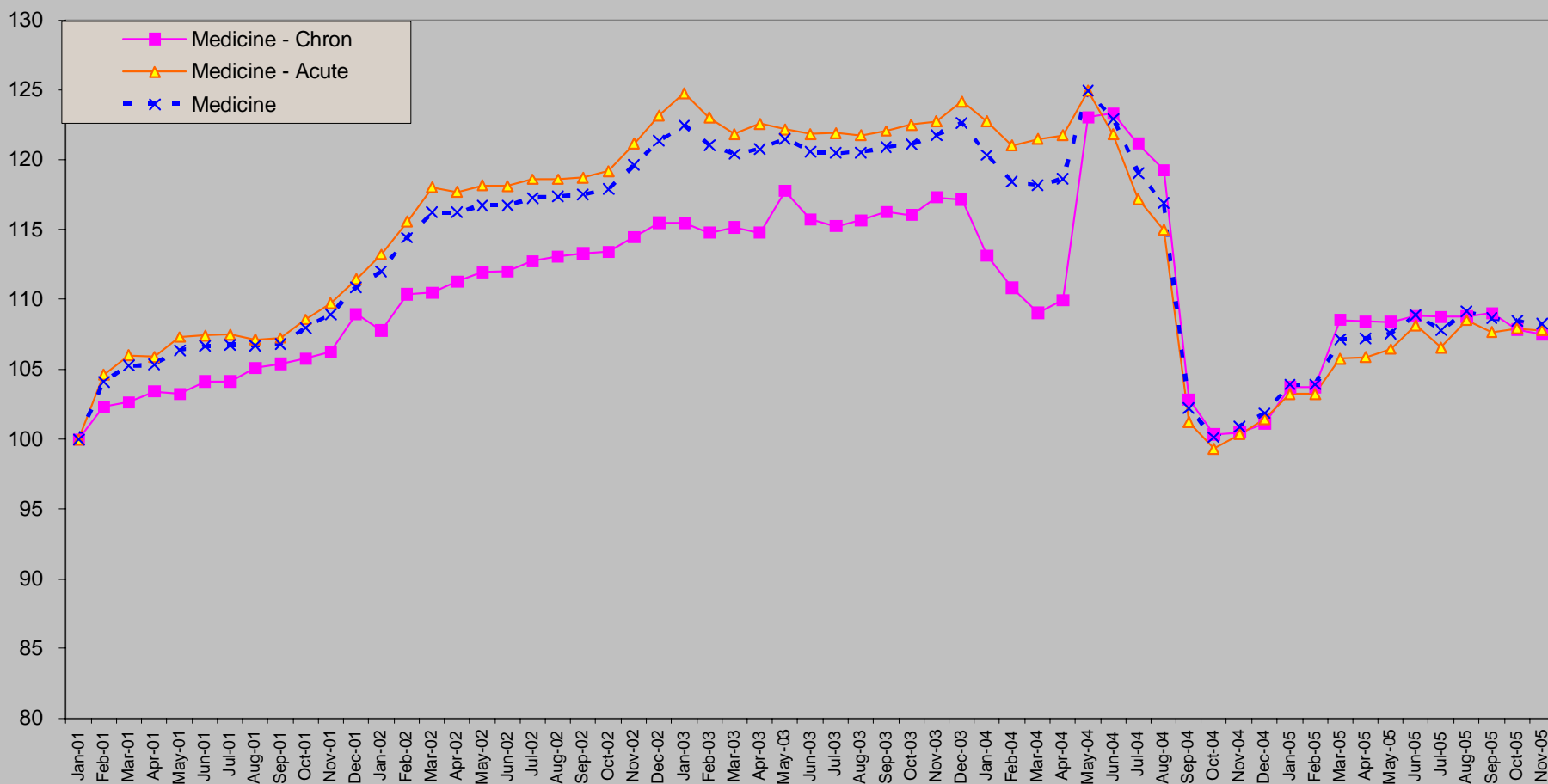
MPI: 5 major categories



MPI Hospital sub-categories



MPI Medicine category and sub-categories



Limitations

- Submitted medical scheme claims – not total spend
- Specific medical schemes
- Coding practices
- Substitution effects – frequency of weighting changes
- Other influences:
 - Benefit adjustments
 - Demographic changes
 - Regulatory changes
 - Medical practice
 - Provider agreements

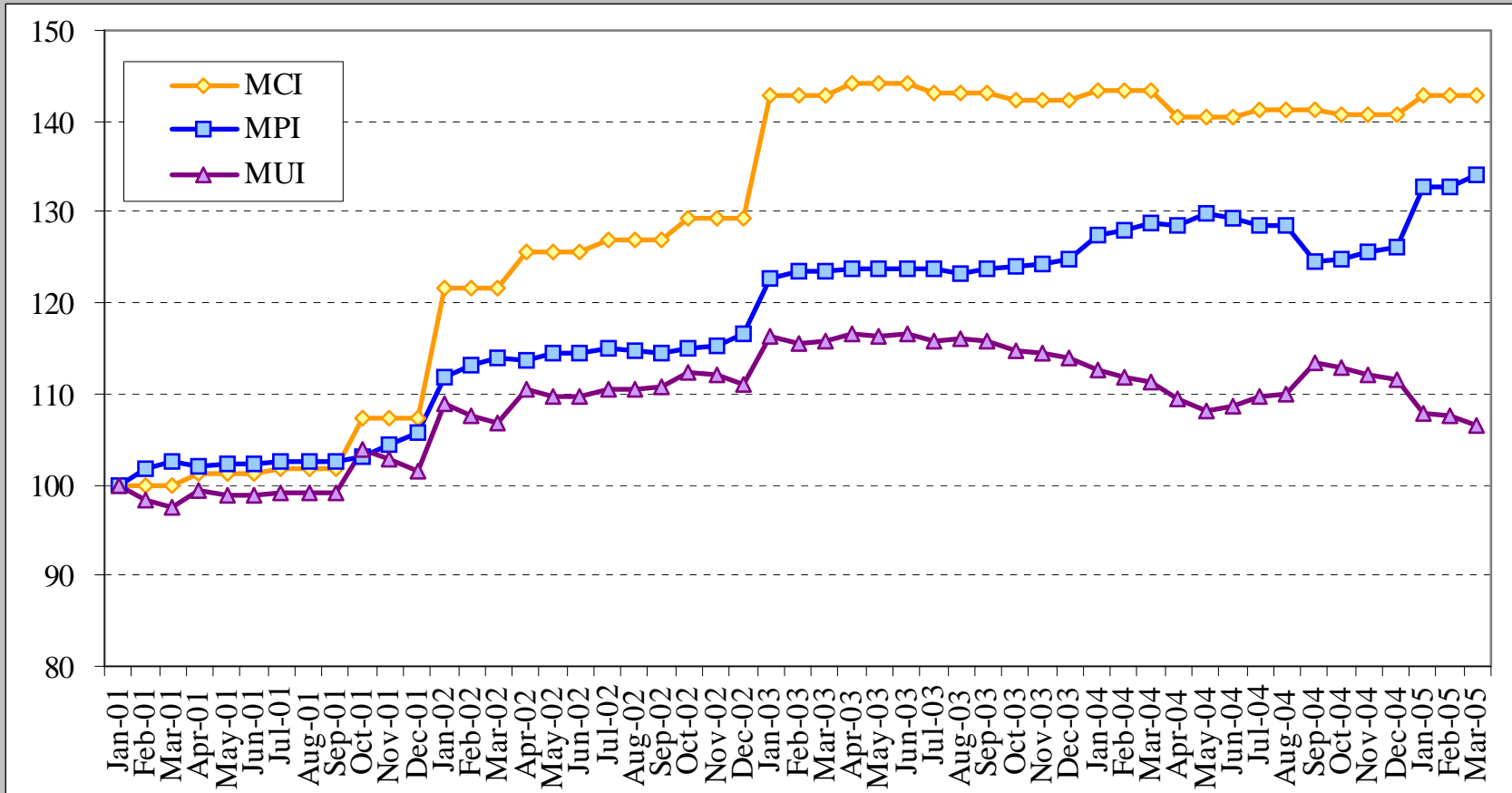
MCI Adjustments

- Utilisation trends are driven by a number of factors including:
 - Benefit design;
 - Changing demographics;
 - Changing treatment patterns and practices;
 - Attitudes toward claiming;
 - Member plan movements;
 - Changes in medical technology.

MUI

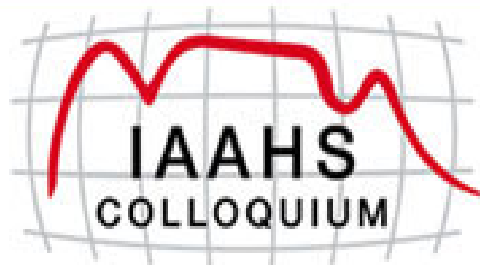
- Calculated from MPI and MCI
- $MUI = MCI / MPI$
- Assumes that change not attributable to price are utilisation
- MCI is after adjustment

MCI/MPI = MUI Results



Further work....

- More extensive data pool
 - Coding consistency!
- Impact of alternative reimbursement mechanisms
- Tracking utilisation
- Measuring quality



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