Report on the Development of
Allied Health Indicators for Intervention (IFI)
and Performance Indicators (PI)

and Revision of
Allied Health-sensitive ICD-10-AM codes for
inclusion in ICD-10-AM Edition Two

EXECUTIVE SUMMARY &
CHAPTERS 1,2 & 3

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January 2000
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NOT DEFINED.
Acknowledgments

This report is the culmination of an enormous amount of work from a wide range of individuals and groups across Australia.

There are actually three discreet pieces of work within the report:

- The development of the Indicators for Intervention
- The modelling of Performance Indicators
- The review of the Allied Health – sensitive codes within ICD-10-AM.

In each of these areas the research team relied heavily on expert comment from practising allied health clinicians, staff of the National Centre for Classification in Health and from the project steering committee.

We are particularly grateful to the NAHCC Committee for its guidance and perseverance with the task.

Throughout the project we have been impressed by the extent to which the various (and often disparate) allied health professions have worked together in open and constructive debate around the important issues of describing their contribution to the health care process.

The national series of workshops involved approximately four hundred Allied Health professionals and health bureaucrats. We are especially grateful for their generous contribution both during and after the workshops.

The six field test sites undertook voluntary collection of data for the project. This was in addition to the burdens of routine data collection and was a significant imposition on staff time.

The NAHCC member associations also contributed greatly to the work by providing regular advice and review of the evolving IFI set.

The Project Management Team worked tirelessly throughout the project. Paul Murray, David Stokes and Gayle Smith gave up many of their mornings to attend project meetings and were very generous with their time and involvement.

We would like to record our appreciation to Caroline Bui who collated much of the information that appears in Chapter 2.

Finally, we are indebted to the Commonwealth Department of Health and Aged Care for its financial support and the particular assistance of the following people: Ros Sorenson, Janet Lapworth, Jo Murray, Sean Lynch and Martin Fletcher. Their support and encouragement are much appreciated.
The National Allied Health Casemix Committee

The National Allied Health Casemix Committee (NAHCC) is the peak body representing Australia’s Allied Health professions in matters pertaining to casemix classification, outcomes reporting and health funding. It has representation from all major Allied Health professions, the eight state and territory Allied Health Casemix Committees, the Health Professions Council of Australia and the Commonwealth Department of Health and Aged Care.

NAHCC has a research secretariat housed within the Health Services Management Unit at RMIT University in Melbourne. NAHCC is funded primarily by the Commonwealth Department of Health and Aged Care and also receives membership fees from its member associations.

NAHCC undertook this current piece of research over the time period July 1998 to August 1999 to achieve three goals:

- Develop *Indicators for Intervention* – a classification system that would flag the reason that Allied Health Professionals (AHP) are involved with health care of patients and the community.
- Develop a model for *Performance Indicators* – a model that would be AHP-effective, yet remain client / patient centred
- Review the Australian Allied Health (Activity) Classification System (Version One) to reflect changes in the broader ICD-10-AM system

The work was performed in a collaborative and consultative fashion, drawing on the knowledge of, and interaction from highly networked groupings of AHPs across Australia.

The project was advised by a steering committee comprising health policy experts, casemix development experts, practising AHPs in key management positions and Commonwealth and State government health agency officials. Its membership was:

- Ms Ros Sorensen  
  Commonwealth Department of Health and Aged Care
- Mr Martin Fletcher  
  Commonwealth Department of Health and Aged Care
- Ms Jo Murray  
  Commonwealth Department of Health and Aged Care
- Professor Stephen Duckett  
  Health Sciences, LaTrobe University
- Mr Scott Lisle  
  New South Wales Health
- Mr Paul Murray  
  Austin and Repatriation Medical Centre, Melbourne
- Ms Gayle Smith  
  Royal Children’s Hospital, Melbourne
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- Mr David Stokes  
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Denotes members of the National Allied Health Casemix Committee’s Executive.

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Diagram 1 (on the following page) places the research within the context of previous work conducted by NAHCC and planned future activities.
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DIAGRAM ONE: THE CURRENT RESEARCH PROJECT IN CONTEXT

THE OLD HEALTHCARE PARADIGM
- healthcare funding historically based
- provider focus
- absence of standardised input descriptors
- strong hospital (inpatient) focus
- no systematic linking of activity to outcomes
- limited reporting of (crude) output data
- limited coordination of the different care provision types
- organisations structured along professional lines
- culture of professional autonomy/individual-patient focus
- limited cooperation/competition between public providers

PREVIOUS RESEARCH
- Minimum data set
- Allied health activity hierarchy
- Allied health activity/intervention code set ICD-10-AM
- Recommend IFI development

ENVIRONMENTAL CONTEXT
- Literature review

CURRENT RESEARCH
- NAHCC IFI MODEL
  - Levels A + B developed
  - C + D recommended for next phase
- NAHCC PI MODEL
  - Contextual framework for performance research
- ALLIED HEALTH RELEVANT ICD-10-AM
  - ICD-10-AM Ed. 2 codes agreed

IFI DEVELOPMENT
- Chapter 3
  - Consultation
  - Identify stakeholders
  - Search existing material
  - Develop model
  - Test model (qualitative)
  - Test model (quantitative)

ACTIVITY CODES REVIEW - ED. 2
- Chapter 5
  - Provider neutral
  - 5 axes
  - Merge to form Ch. 21 of ICD-10-AM

IFI REFINEMENT
- Chapter 3
  - Review A + B
  - Develop C + D

PI DEVELOPMENT
- Chapter 4
  - Test a range of PI's in all care provision settings
  - Establish benchmarks for thresholds

ACTIVITY CODE REVIEW
- Chapter 5
  - Time linked code data
  - Review codes within context of overall ICD-10-AM 3rd ed.

THE NEW HEALTHCARE PARADIGM
- healthcare funding outcome focussed health
- constructive competition between care providers
- customer focus
- complete separation between purchaser and provider
- evidence-based practice
- organisations structured along “product” lines
- low cost, readily accessible IT support
- increased emphasis on ambulatory/community care
- greater “public” participation from the private sector
- routine public reporting of performance indicators
- culture of interdisciplinary teamwork
- move from individual patient to bigger picture view
- more even distribution of AH across all settings

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INDICATORS FOR INTERVENTION

Development of the Indicators for Intervention (IFI) statistic was recommended in the 1997 *NAHCC Australian Allied Health Classification System (AAHCS)* publication. It was acknowledged that the Allied Health Minimum Data Set, although clearly able to describe various demographics of the client and characteristics of the care provider and the setting, needed an additional descriptor that provided information on the *reason why the AHP was providing care* to the client.

AHPs do make extensive use of Diagnosis Related Groupings (DRG) in their work, but there is wide acknowledgment that much of Allied Health’s activity is not well described by this procedure-based system that is grounded in a medical / illness paradigm of care.

The IFI set, developed as a component of this current project, is a client-centred classification of these reasons for intervention.

It sits within the pre-existing Allied Health Minimum Data Set but has potential applications beyond the mere description of the client.

Some of the potential applications for the IFI classification are:

- A foundation for Allied Health Professional (AHP) - sensitive Performance Indicators
- A basis for funding of AHP services in a prospective manner in a variety of care delivery settings (much as DRGs have been applied to the funding of acute inpatient services)
- A robust benchmarking tool for AHPs to use within and across healthcare organisations
- A component of AHP staff development / appraisal systems
- A means of allocating workloads for AHPs
- A means of predicting AHP resourcing requirements in local, regional and national populations
- A “cofactor” which may add more predictive value to DRG weightings
- A screening / referral tool that may be used by health professionals to determine the need for AHP assessment of the client
THE IFI MODEL

DEFINITION
The Indicator for Intervention is a *service provider* description of the characteristics of the individual or population which indicate need for intervention.

TEMPLATE
The IFI must:

- Focus on patient/client clinical issue;
- Cover all care delivery settings;
- Contain a “top level” set of IFIs which then drill down to more specific sub-IFIs;
- Be valid and reliable;
- Be “linkable” to PIs;
- Be compatible with existing classification systems;
- Cover the majority of cases;
- Be Allied Health-*sensitive*, but not Allied Health-*specific*
- Assume that there is a unique patient (client) identifier;
- Not subdivide Patients (clients) “at risk” from those with an existing condition; **
- Be mutually exclusive;
- Can be a mix of functional, (patho)physiological, vocational and social issues.

** Although subdivision of the at risk and actual condition will be important in later applications of the IFI set (such as resource prediction).

HIERARCHY FOR THE IFI SET

The levels within the IFI hierarchy are structured as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>generic grouping of issues into Person or Environment</td>
</tr>
<tr>
<td>Level B</td>
<td>broad concepts / issues which drill down from either person or environment</td>
</tr>
<tr>
<td>Level C</td>
<td>specific issues which are clustered under a particular B Level concept</td>
</tr>
<tr>
<td>Level D</td>
<td>highly specific issues which forms a subset of a particular Level C issue</td>
</tr>
</tbody>
</table>
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THE LEVEL B IFI SET
(The lower levels of the hierarchy are fully described in the main body of the report.)

TABLE ONE: THE B LEVEL INDICATORS FOR INTERVENTION

<table>
<thead>
<tr>
<th>IFI</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychosocial factors</td>
</tr>
<tr>
<td>110</td>
<td>Cognition</td>
</tr>
<tr>
<td>120</td>
<td>Relationships</td>
</tr>
<tr>
<td>130</td>
<td>Behaviour issues</td>
</tr>
<tr>
<td>140</td>
<td>Adjustment</td>
</tr>
<tr>
<td>150</td>
<td>Affect</td>
</tr>
<tr>
<td></td>
<td>Sensorimotor and Biomechanical Functions</td>
</tr>
<tr>
<td>210</td>
<td>Head and Trunk control</td>
</tr>
<tr>
<td>220</td>
<td>Upper limb function</td>
</tr>
<tr>
<td>230</td>
<td>Lower limb function</td>
</tr>
<tr>
<td>240</td>
<td>Urinogenital issues</td>
</tr>
<tr>
<td>250</td>
<td>Swallowing / Feeding</td>
</tr>
<tr>
<td>260</td>
<td>Vision issues</td>
</tr>
<tr>
<td>270</td>
<td>Ocular issues</td>
</tr>
<tr>
<td>280</td>
<td>Vestibular Balance</td>
</tr>
<tr>
<td>290</td>
<td>Gastro-intestinal function</td>
</tr>
<tr>
<td>300</td>
<td>Neuropathic pain</td>
</tr>
<tr>
<td>310</td>
<td>Respiratory function</td>
</tr>
<tr>
<td>320</td>
<td>Cardiovascular function</td>
</tr>
<tr>
<td>330</td>
<td>Speech</td>
</tr>
<tr>
<td>340</td>
<td>Language</td>
</tr>
<tr>
<td>350</td>
<td>Voice</td>
</tr>
<tr>
<td>360</td>
<td>Fluency</td>
</tr>
<tr>
<td>370</td>
<td>Hearing issues</td>
</tr>
<tr>
<td></td>
<td>Nutritional factors</td>
</tr>
<tr>
<td>410</td>
<td>Biochemical and metabolic issues</td>
</tr>
<tr>
<td>420</td>
<td>Food tolerance</td>
</tr>
<tr>
<td>430</td>
<td>Nutrient adequacy</td>
</tr>
<tr>
<td></td>
<td>Social, Occupational and Environment factors</td>
</tr>
<tr>
<td>510</td>
<td>Productivity (work/education/home)</td>
</tr>
<tr>
<td>520</td>
<td>Leisure activities</td>
</tr>
<tr>
<td>530</td>
<td>Environment</td>
</tr>
<tr>
<td>540</td>
<td>Self maintenance</td>
</tr>
</tbody>
</table>

IFI RECOMMENDATIONS

- NAHCC continue to work closely with the Allied Health professions in the development and refinement of the IFI set.
- NAHCC develop an education strategy for AHPs and other stakeholders on the IFI concept. This should be done in conjunction with the National Centre for Classification in Health.
- The Level B IFI set be more extensively tested over a longer period of time to capture long-stay patients.
- Level C and D IFIs be established and tested with clear definitions.
PERFORMANCE INDICATORS

The nature and culture of AHP practice was explored and found to be distinctly different in many respects to that of medicine. Many of the key concerns of AHPs centred around the desire to substantiate their belief that their clinical interventions were both effective and efficient.

The difficulty that they often encountered was the inability to tease apart the respective influence of doctors, nurses and AHPs in patient/client outcome. While there is near universal acknowledgment of the need to be wholistically focussed in examining health outcomes, there is also clear support for the view that a reductionist approach to outcomes could identify the specific impact of the AHPs.

This project developed a model for *AHP-sensitive* Performance Indicators. This *Performance Indicators* model, embedded within the Commonwealth’s own quality performance framework, provides a means for identifying the various AHP contributions to healthcare outcomes within the bigger picture.

It is anticipated that the existence of the model will provide a solid framework for a range of projects to be undertaken by groups (AHP or broader) wishing to examine performance in specific areas of healthcare.

The CDHAC uses an eight-dimension framework for the conceptualisation of the various facets of performance in acute healthcare settings (detailed in the table below). Combining these performance dimensions with the newly established IFIs creates a series of performance measures that are client focussed, yet strongly reflect the Allied Health involvement.

**TABLE TWO: THE QUALITY PERFORMANCE DIMENSION FACTORS**

<table>
<thead>
<tr>
<th>CDHAC QUALITY PERFORMANCE</th>
<th>DIMENSION FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Safety</td>
<td>Effectiveness</td>
</tr>
<tr>
<td>Continuity</td>
<td>Technical proficiency</td>
</tr>
<tr>
<td>Appropriateness</td>
<td>Acceptability</td>
</tr>
</tbody>
</table>

From: Quality and Outcome Indicators for Acute Healthcare Services National Hospital Outcomes Program, Health Service Outcome Branch CDHFS AGPS Canberra 1997

The performance elements are then applied to the IFIs as follows:

**Performance Indicator (PI) = IFI + dimension factor associated with a threshold**

Table 4 illustrates some of the IFI – PI matrix possibilities using this model. These examples of C level IFIs are “drill-down” options from Level B.
Executive Summary

Table Three: Level C IFI-PI Matrix Examples

<table>
<thead>
<tr>
<th>C level IFI examples with roll-up B level IFI</th>
<th>Dimensions of performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Access</td>
</tr>
<tr>
<td>Cognition Memory</td>
<td>✗</td>
</tr>
<tr>
<td>Head &amp; Trunk Control Joint / Bone issue</td>
<td>✗</td>
</tr>
<tr>
<td>Food Tolerance Enzyme deficiency</td>
<td>✗</td>
</tr>
<tr>
<td>Nutrient Adequacy vitamin adequacy</td>
<td>✗</td>
</tr>
<tr>
<td>Speech Acquired resonance</td>
<td>✗</td>
</tr>
<tr>
<td>Environment Housing</td>
<td>✗</td>
</tr>
<tr>
<td>Vision issues Vision loss</td>
<td>✗</td>
</tr>
</tbody>
</table>

These may have relevance at service planning level and for broad quality improvement programs. Individual clinicians and Allied Health departments are more likely to be interested in specific PIs created from IFIs at Level C.

Potential PI Applications

NAHCC believes that adoption of this framework will help individuals and groups involved in PI development by ensuring consistency across Australia. With both the PI framework and the agreed definitions for the IFIs, performance measurement will become much easier and more consistent.

Some possible applications:

- By mapping to other classification systems, the PIs could be used to compare outcomes across health professions;
- Allied Health professionals could determine benchmarks for PIs to compare their services with like departments in other agencies;
- PIs could form a component of service agreements between health professionals and hospitals / health centres or funding bodies;
- Funding models could build in an “outcome” component by nominating appropriate PIs (complete with expected thresholds) that should be achieved. For each PI selected for development, there should be a period of data collection sufficient to permit the determination of a threshold value based on statistical manipulation of a quantitative data set. This may be the mean value over all cases, or a consensus view from clinicians on an acceptable threshold. It may be that the acceptable threshold will vary between care delivery settings.
**PI RECOMMENDATION**

- The Performance Indicator work research should be progressed further in conjunction with the completion of all levels of the Indicators for Intervention classification.

**THE AUSTRALIAN ALLIED HEALTH CLASSIFICATION SYSTEM**

The AAHCS arose out of earlier NAHCC work, the National Reference Standards project. The AAHCS provided, for the first time in Australia, a nationally consistent set of “activity” codes that ultimately became absorbed into the ICD-9 then ICD-10-AM coding systems.

Their availability allowed AHPs across Australia to begin describing their healthcare inputs consistently and led to the possibility of benchmarking services between organisations.

The representation of all Allied Health activity within the one standardised framework is illustrated below.

**DIAGRAM TWO: THE AUSTRALIAN ALLIED HEALTH CLASSIFICATION SYSTEM ACTIVITY HIERARCHY**

The activity codes in the ICD-10-AM manual derive from this sub category of activity.
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The evolving nature of the ICD procedures and diagnoses required that the Allied Health activity codes move with the broader set.

A key change in the ICD-10-AM Edition Two manual is the move to provider neutrality. To remain consistent, the Allied Health activity codes required considerable modification. These modifications have been made in anticipation of the release of ICD-10-AM Edition Two in January 2000. Forward plans are also in place for a comprehensive review of the codes for Edition Three of ICD-10-AM in 2002.

The revised activity code set is fully described in Chapter 5 in the main body of the report.

AAHCS RECOMMENDATIONS

- The NAHCC Activity classification model be adopted as a nationally consistent means of describing Allied Health activity.

- The NAHCC activity classification model be used in any software developed to capture Allied Health activity in all care provision settings.

- The ICD-10-AM Edition Two codes relevant to Allied Health be captured routinely in acute healthcare settings so that a comprehensive data base can be established and made available for benchmarking purposes and health management research.

- An education program be established to inform AHPs (and others involved with the collection of Allied Health related data) of the changes to the procedure codes. This should be planned in association with the National Centre for Classification in Health (NCCH).

- NAHCC investigate ways of accessing the state / territory data in order to conduct research into the contribution of Allied Health in acute care settings.
CHAPTER 1: INTRODUCTION
1.1 BACKGROUND TO THE IFI – PI PROJECT

The Healthcare paradigm is changing

Since its inception, The National Allied Health Casemix Committee has been aware that the Australian healthcare system has been in transition from the older paradigm of provider (discipline) focus to the new paradigm of client centred and outcomes focus. NAHCC fully embraces the move to this new paradigm and has strategies in place to ensure that AHPs remain relevant and central in the healthcare system.

AHPs are faced with new challenges consequent to this shift in paradigm. Chief among these challenges are:

- Clear reporting of the resources consumed by AHPs in terms of patient / client outcomes
- Demonstrated efficiency in the delivery of services
- Justification of treatments provided in terms of evidence-based practice
- Demonstrated ability to maintain service flexibility in the context of constant organisational change (ie ability to manage change)

To address these challenges Allied Health requires national standards for reporting of inputs, processes, inputs and outcomes within the healthcare system.

Building on the work of the Australian Allied Health Classification System

The pioneering work of the NAHCC National Reference Standards Committee delivered a nationally consistent set of activity (input) descriptors which have been enthusiastically embraced by AHPs and have now been incorporated into the ICD-10-AM coding system. This (mostly) solved the problem of standardising the input component.

The major need now, is for an integrated approach to the reporting of the process, outputs and outcomes. Clearly Allied Health requires a comprehensive information system that is both patient focussed and able to identify outputs and outcomes of AHP activity.

Benefits and limitations of DRGs

Diagnosis Related Groups (DRGs) are widely used in the Australian healthcare sector for a range of applications.

AHPs have attempted to use DRGs as the “common currency” in their work, particularly in acute hospital settings. Doing so enables cross-communication with other professions in the health care team. DRGs have been very valuable as a means of health care comparison across the country and indeed around the world. However DRGs have proved far from satisfactory in describing or predicting AHP involvement in care. Chapter 3 describes the lack of correlation between patient DRG assignment and AHP intervention.

Moving towards a patient-centred, outcomes focussed performance reporting paradigm

The following model illustrates the evolution of a patient-focused information system for Allied Health. It describes the old healthcare environment (or paradigm) and details the various steps required to engage in the new healthcare paradigm.
Chapter 1 – Introduction

Diagram 1.1: Information System Model for Allied Health

The old healthcare paradigm
- healthcare funding historically based
- absence of standardised input descriptors
- limited coordination of the different care provision types
- culture of professional autonomy and individual-patient focus
- provider focus
- strong hospital (inpatient) focus
- limited reporting of (crude) output data
- organisations structured along professional lines
- limited cooperation or competition between public providers

The Australian Allied Health Classification System (AAHCS)
Provided a nationally consistent set of “input descriptors” for AH and a minimum data set that standardised the recording of patient characteristics and allowed AH to “talk a common language”.

The NAHCC data collection / collating software requirements recommendations
Acted as a national standard for development of software that can be used to capture AH data in a format that permits roll-up of data across organisations / states.

Indicators for intervention
- Permits comparison of “like” patients within and across organisations.
- Building block for AH resource consumption prediction models

Performance indicators
- Framework for development of Performance indicators
- Developed
- Next stage: refine & extend

NAHCC Information Technology Strategy for Allied Health

Enhanced access to data bases:
- Department / Organisation / State,
- Territory / National

Enhanced access to IT: hardware / software / skills

The new healthcare paradigm
- healthcare funding outcome focussed
- customer focus
- evidence-based practice
- low cost, readily accessible IT support
- greater “public” participation from the private sector
- culture of interdisciplinary teamwork
- more even distribution of Allied Health services across all settings (decreased concentration within hospitals)
- constructive competition between care providers
- complete separation between purchaser and provider
- organisations structured along “product” lines
- increased emphasis on ambulatory / community care
- routine public reporting of performance indicators
- move from individual patient to bigger picture view
- greater “public” participation from the private sector
- culture of interdisciplinary teamwork
- more even distribution of Allied Health services across all settings (decreased concentration within hospitals)
This current research project delivered three key components of the above system:

- A nationally-consistent set of Allied Health Indicators for Intervention;
- A model for Performance Indicators covering health issues with relevance to Allied Health.

It is represented schematically by Diagram 1.2.
THE OLD HEALTHCARE PARADIGM

- healthcare funding historically based
- provider focus
- absence of standardised input descriptors
- strong hospital (inpatient) focus
- no systematic linking of activity to outcomes
- limited reporting of (crude) output data
- limited coordination of the different care provision types
- organisations structured along professional lines
- culture of professional autonomy/individual-patient focus
- limited cooperation/competition between public providers

THE NEW HEALTHCARE PARADIGM

- healthcare funding outcome focused health
- constructive competition between care providers
- customer focus
- complete separation between purchaser and provider
- evidence-based practice
- organisations structured along “product” lines
- low cost, readily accessible IT support
- increased emphasis on ambulatory/community care
- greater “public” participation from the private sector
- routine public reporting of performance indicators
- culture of interdisciplinary teamwork
- move from individual patient to bigger picture view
- more even distribution of AH across all settings

PREVIOUS RESEARCH

NATIONAL REFERENCE STANDARDS PROJECT

Appendix 6
- Minimum data set
- Allied health activity hierarchy
- Allied health activity/intervention code set ICD-10-AM
- Recommend IFI development

ENVIRONMENTAL CONTEXT

Chapter 2
- Literature review

CURRENT RESEARCH

IFI DEVELOPMENT

Chapter 3
- Consultation
- Identify stakeholders
- Search existing material
- Develop model
- Test model (qualitative)
- Test model (quantitative)

PI FRAMEWORK

Chapter 4
- Use existing PI framework
- Form matrix with IFI set

ACTIVITY CODES REVIEW - ED. 2

Chapter 5
- Provider neutral
- 5 axes
- Merger to form Ch. 21 of ICD-10-AM

FUTURE RESEARCH

IFI REFINEMENT

Chapter 3
- Review A + B
- Develop C + D

PI DEVELOPMENT

Chapter 4
- Test a range of PI’s in all care provision settings
- Establish benchmarks for thresholds

ALLIED HEALTH RELEVANT ICD-10-AM

- ICD-10-AM Ed. 2 codes agreed

NAHCC IFI MODEL

- Levels A + B developed
- C + D recommended for next phase

NAHCC PI MODEL

- Contextual framework for performance research
1.2 INDICATORS FOR INTERVENTION

The NAHCC National Reference Standards (NRS) project, completed in 1997, established activity codes for ten of the Allied Health professions and a minimum data set to describe the client characteristics. The NRS also recommended the creation of a statistic called the Indicator for Intervention (IFI) which would act as a “diagnosis” for the respective Allied Health professions.

It is generally agreed that AN-DRGs (for acute inpatient care) do not always explain or predict the full range of Allied Health interventions, so the IFIs can be viewed as a tool for appropriately grouping “like” patients or interventions. For non-inpatient settings, the IFIs will give allied health a standardised means of grouping and comparing patient types.

DEFINITION OF AN IFI

An IFI is a *service provider* description of the characteristics of the individual or population which indicate need for intervention.
An IFI is an overall perspective of a patient from initial assessment to output.

TEMPLATE FOR IFI MODEL DEVELOPMENT

The IFI should exhibit the following characteristics:

- Focussed on patient / client clinical issue rather than on profession.
- The IFI set will cover all service delivery settings.
- A classification structure will exist with a generic “top level” set of IFIs which then drill down to more specific sub-IFIs.
- The IFIs will be valid and reliable.
- IFIs will be “linkable” to PIs.
- IFIs will be compatible with existing classification systems.
- IFI list will cover the majority of cases.
- IFIs will not be Allied Health specific, but IFIs will have meaning to functions of Allied Health.
- There is a unique identifier.
- ‘At risk’ or present condition is not subdivided.
- IFIs will be mutually exclusive, however a patient may be assigned more than one IFI.
- IFIs can be a mix of functional, psychological, vocational and social issues.

1.3 PERFORMANCE INDICATORS:

The (then) CDHFS commissioned Professor Neil Boyce and co-researchers to investigate a national model for development of Performance Indicators. The resultant research report, *Quality and Outcome Indicators for Acute Healthcare Services* – National Hospitals Outcomes Programs Health Services Outcomes Branch, CDHFS was published in 1997.

Boyce proposed an eight dimension framework for categorising the various aspects of “health care performance”. This is reproduced as the table below.
TABLE 1.1: QUALITY PERFORMANCE DIMENSIONS

<table>
<thead>
<tr>
<th>DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Access</td>
</tr>
<tr>
<td>2. Efficiency</td>
</tr>
<tr>
<td>3. Safety</td>
</tr>
<tr>
<td>4. Effectiveness</td>
</tr>
<tr>
<td>5. Continuity</td>
</tr>
<tr>
<td>6. Technical proficiency</td>
</tr>
<tr>
<td>7. Appropriateness</td>
</tr>
<tr>
<td>8. Acceptability</td>
</tr>
</tbody>
</table>

This current research project explored ways of linking the IFIs to dimensions, thereby creating Performance Indicators that relate directly to Allied Health activities.

The researchers consider all dimensions in the Boyce model to be of equal validity and weight from an Allied Health perspective.

This project developed an overarching model that will facilitate the development of PIs in all of the dimensions in the Boyce model.

1.4 THE AUSTRALIAN ALLIED HEALTH CLASSIFICATION SYSTEM VERSION ONE (AAHCS –V1)

The AAHCSV1 is a means of describing Allied Health activity according to major activity partitions, which then drill down to detailed sub-categories of activity type. It has been and important tool for allied health professions and has provided:

- a common language to communicate key aspects of the business of allied health professionals to in-house senior management and government agencies
- a standardised system for allied health professionals to compare their clinical practices
- a rich database for research into allied health activities, interventions and outcomes
- an ability to benchmark services across organisations using Australian data.

The AAHCSV1 comprises two components:

A. The Allied Health Activity Classification Hierarchy
B. The Allied Health Minimum Data Set

The Allied Health Activity Classification Hierarchy has four partitions at the first tier level:

- clinical care
- clinical services management,
- teaching and
- training and research

The Minimum Data Set defines twenty data items associated with patient care.
**Diagram 1.3: The Allied Health Activity Classification Hierarchy**

The activity codes in the Allied Health chapter of the ICD-10-AM manual derive from this subcategory of activity.

### First Tier of the Hierarchy

The first tier of the classification hierarchy divides all allied health activities into four elements as defined in Table 1.2.

**Table 1.2: AAHCS First Tier Activity Definitions**

<table>
<thead>
<tr>
<th>First Tier Activity</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Care</td>
<td>Activities which provide a service to an individual, group or community to influence health status</td>
</tr>
<tr>
<td>Clinical Services Management</td>
<td>Any activities which support and are essential to clinical care</td>
</tr>
<tr>
<td>Teaching &amp; Training</td>
<td>Activities which relate to the imparting of knowledge, skills and clinical activities</td>
</tr>
<tr>
<td>Research</td>
<td>Activities undertaken to advance the knowledge of the delivery of care to an individual, group or community</td>
</tr>
</tbody>
</table>
THE ALLIED HEALTH MINIMUM DATA SET

In addition to classifying allied health activity, it is necessary to collect data items in relation to a patient visit or episode of care. These data include characteristics about the patient, the setting in which services are provided, and information on the referral agent and service provider.

**TABLE 1.3: AAHCS MINIMUM DATASET ELEMENTS**

<table>
<thead>
<tr>
<th>DATA ELEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique Client Identifier</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Date of Birth</td>
</tr>
<tr>
<td>Indigenous Status</td>
</tr>
<tr>
<td>Area of Usual Residence</td>
</tr>
<tr>
<td>Postcode</td>
</tr>
<tr>
<td>Telephone/Contact Number</td>
</tr>
<tr>
<td>Need for Interpreter Services</td>
</tr>
<tr>
<td>Preferred Language</td>
</tr>
<tr>
<td>Compensable Status</td>
</tr>
<tr>
<td>Carer Availability</td>
</tr>
<tr>
<td>Date of Service</td>
</tr>
<tr>
<td>Date of Admission (for hospital admitted patients only)</td>
</tr>
<tr>
<td>Client Type</td>
</tr>
<tr>
<td>Service Provider</td>
</tr>
<tr>
<td>Party Relationship</td>
</tr>
<tr>
<td>Referral Source</td>
</tr>
<tr>
<td>Treatment Settings</td>
</tr>
<tr>
<td>Diagnosis</td>
</tr>
</tbody>
</table>

The IFI was recommended in the AAHCS V1, and has been developed as part of this current project. The IFI set is thus a data element in the Minimum Data Set.

1.5 THE ALLIED HEALTH PROFESSIONS

Allied Health is an integral component of Australia’s healthcare system along with doctors, nurses and administrators. Whilst doctors and nurses are readily identifiable as belonging to their respective groupings, there is no nationally agreed definition of what constitutes an Allied Health Profession. Within hospitals (where most Allied Health professionals are employed) there is considerable variance in the composition of Allied Health divisions.
This report, when referring to Allied Health, encompasses all the professional associations / societies which hold membership of NAHCC. These are:

1. Dietitians Association of Australia
2. Speech Pathology Australia
3. Occupational Therapy Australia
4. Australian Psychological Society
5. Orthoptic Association of Australia
6. Australian Podiatry Council
7. Audiolgical Society of Australia
8. Australian Orthotics and Prosthetics Association
9. Australian Association of Social Workers
10. Australian Music Therapy Association
11. Australian Physiotherapy Association
12. Australian Association of Exercise and Sports Science
13. Australian Association of Medical Illustration and Clinical Photography
14. Hospital Pharmacists Society of Australia

Table 1.4 provides an indication of membership numbers at the national level for some of these professions.

### Table 1.4: Membership Numbers of Organisations Represented on NAHCC

<table>
<thead>
<tr>
<th>PROFESSION</th>
<th>ORGANISATION</th>
<th>NUMBER OF MEMBERS</th>
<th>Year data collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audiology</td>
<td>Audiological Society of Australia</td>
<td>813*</td>
<td>1999</td>
</tr>
<tr>
<td>Dietetics</td>
<td>Dietitians Association of Australia</td>
<td>1981</td>
<td>1999</td>
</tr>
<tr>
<td>Music Therapy</td>
<td>Australian Music Therapy Association</td>
<td>155</td>
<td>1999</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>OT Australia</td>
<td>3504</td>
<td>1999</td>
</tr>
<tr>
<td>Orthoptics</td>
<td>Orthoptic Association of Australia Inc</td>
<td>350</td>
<td>1993/94</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Society of Hospital Pharmacists of Australia</td>
<td>1562</td>
<td>1999</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>Australian Physiotherapy Association</td>
<td>9,500</td>
<td>1999</td>
</tr>
<tr>
<td>Podiatry</td>
<td>Australian Podiatry Council</td>
<td>1,897**</td>
<td>1994</td>
</tr>
<tr>
<td>Prosthetics &amp; Orthotics</td>
<td>Australian Orthotics &amp; Orthotics Association</td>
<td>240</td>
<td>1999</td>
</tr>
<tr>
<td>Psychology</td>
<td>Australian Psychological Society Ltd</td>
<td>7,710***</td>
<td>1999</td>
</tr>
<tr>
<td>Social Work</td>
<td>Australian Association of Social Workers</td>
<td>6050</td>
<td>1999</td>
</tr>
<tr>
<td>Speech Pathology</td>
<td>Speech Pathologists Association of Australia</td>
<td>2,537</td>
<td>1999</td>
</tr>
</tbody>
</table>

**Total** 36,891

Notes:
* membership includes Affiliate, Fellow, Student etc.
** including multiple registrations but figure excludes employed podiatrists in ACT & NT as registration was not a requirement for podiatry practice in 1994.
*** membership does not include Associate, Affiliate or Student.
1.6 THE WIDER ENVIRONMENT

NAHCC is positioned within an extensive network of major players in the Australian Health industry. Although it focuses primarily on its immediate membership and Allied Health professions generally, there are many more relationships that require building and maintaining.

The following diagram depicts most of the key organisations in which NAHCC has a strategic interest.

**Diagram 1.4: NAHCC Strategic Partnerships**

Legend

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAHCC Exec</td>
<td>National Allied Health Casemix Executive Committee</td>
</tr>
<tr>
<td>NAHCC</td>
<td>National Allied Health Casemix Full Committee</td>
</tr>
</tbody>
</table>
| CDHAC        | Commonwealth Dept. for Health & Aged Care  
*Information Technology Branch*  
*National Health Priorities & Quality Branch*  
*Acute & Coordinated Care Branch* |
| HPCA         | Health Professionals Council of Australia |
| AHMA         | Allied Health Managers Association |
| NAHBC        | National Allied Health Benchmarking Consortium |
| NCCCH        | National Centre for Classification in Health |
| State Health Authorities | State & Territory Health Authorities |
| ACCC         | Australian Casemix Clinical Committee |
| ACHS         | Australian Council on Healthcare Standards |
| AIHA         | Australian Institute for Health & Welfare |
| AH Training Institutions | AH Training Institutions |
1.7 REPRESENTING THE RANGE OF CARE PROVISION SETTINGS

NAHCC aims to serve the interests of all sectors in health, from acute tertiary teaching hospitals through to small rural facilities and community health.

It does, however, draw most of its representation from AHPs in major metropolitan hospitals.

One of the advantages of this current project is that both the IFIs and the PIs have wide applicability in any care provision setting. This has allowed NAHCC to better represent the issues and interests of the non-acute hospital and community sectors.

In the interests of clarity and brevity this report consistently refers to “patients”. NAHCC does recognise that this term promotes an image of ill-health within some sectors. Wherever the word patient appears it is meant to be inclusive of all customers, clients, users of the health system.

The report does, however, limit itself to discussion of individuals. The areas of population health (promotion and prevention) are beyond the scope of this current research.
ENVIRONMENTAL CONTEXT

This chapter provides some background on the changing nature of healthcare organisation and delivery. Diagram 2.1 places the information in the context of the research project.

**DIAGRAM 2.1: CHAPTER TWO IN CONTEXT**

- **ENVIRONMENT CONTEXT**
  - Chapter 2

- **PREVIOUS RESEARCH**
  - National Reference Standards Project
  - Appendix 6
  - Recommend IFI devt.

- **CURRENT RESEARCH**
  - IFI Development
    - Chapter 3
  - PI Framework
    - Chapter 4
  - Activity Codes Review - IED: 2
    - Chapter 5
  - A. H. Relevant ICD-10-AM

- **FUTURE RESEARCH**
  - IFI Refinement
    - Chapter 3
  - PI Development
    - Chapter 4
  - Activity Code Review
    - Chapter 5

This chapter covers:
- Worldwide trends in healthcare
- Changes in the funding of hospitals
- Impact of Changes to the healthcare System on the health professions
- Quality Control
Chapter 2 – Environmental Context

2.1 WORLDWIDE TRENDS IN HEALTH CARE

In the Western world considerable changes are taking place in economies and political structures. Characteristics of these changes are:

- the tendency of democratic politicians to keep promising more for less
- the loss of faith in bureaucratic solutions
- the challenges to governments posed by economic globalisation
- the decline of the industrial state as a result of the information revolution (Sturgess, 1995). This has led to changes in the way governments see health care services and has shifted the responsibility for service delivery.

Mistry (1997, 1) has outlined how the hospital bed is no longer the unit of currency in health care. Throughout the developed world the number of hospital beds is declining. In Germany the number of hospital beds has declined from 700,000 to 650,000 over the last 20 years. In the USA 400 hospitals merged between 1980 and 1991, and 353 closed between 1980 and 1988. In Denmark hospital beds were reduced by one-third between 1981 and 1991. Seven hospitals are merging in Copenhagen to provide 5200 beds. In England there were 245 hospital closures between 1990 and 1994. Reasons for these changes include:

- technological advances and changes in mode of care
- the unsuitability of old buildings
- problems of inner cities and demographic shifts
- a shift from primary to community care
- financial pressures and competition
- changing health needs, the targeting of sections of the population with below average standards of health
- provision of accident and emergency services
- medical staffing issues and the requirements of medical education and research

Developments in diagnostic techniques, anaesthetics and pain relief have facilitated day surgery, decreased recovery time and decreased length of stay. In 1994 in the UK the Department of Health stated that 50% of elective surgery should be carried out as day cases, with an expected 60% by 1996-1997. The number of day cases increased from 684,000 in 1982 to 2.1 million in 1993-1994. Average length of stay in acute care hospitals has decreased from 8.6 days in 1982 to 5 days in 1995. As a result of the way surgical services are supplied there is a nationally falling demand for acute care beds. However, the remaining beds have become more expensive because:

- the fixed costs of the hospital remain, but are spread over a smaller number of inpatient episodes
- the patients admitted require proportionally more attention because they are more seriously ill
- the real costs of capital assets means they have to be fully utilised to earn the expected returns.
Chapter 2 – Environmental Context

One change noted in the UK since the implementation of these procedures was a national rise in emergency admissions. This has been suggested to be partly as a result of the increase in respiratory conditions reported in research. There were other changes:

- Some conditions previously treated at home now go to hospital because new treatments are offered.
- The increase in number of old people living alone means that, if they have nobody to care for them, hospital is a short term option.
- Success of ambulance workers means patients arrive alive at hospital.
- Greater health awareness of the public means they react more quickly at the onset of a problem.

England (1997) and others have stipulated that in future health care will involve:

- patients making informed choices about their treatment/care and working with practitioners to design and follow treatment plans or adopting behaviours to prevent illness;
- providers using information to have patient-centred, outcome-focused care;
- purchasers of health services participating in development of evaluative health plan criteria and forming long-term partnerships with health care organisations to improve their enrollees’ health status.

Health care organisations will compete on quality and price, be held accountable for cost effectiveness and for improving the health status of the population. England outlines how US companies which provide health insurance for their employees are now entering into insurance agreements with service providers which focus on:

- care management - For example, one company examined absenteeism and found many workers were absent as a result of the asthma attacks and hospitalisation of their children. The doctors who could provide prevention and home treatment were then favoured because of an increased return-to-work rate for employees.
- performance management - Relevant questions may be: Are we getting what we are paying for? Is a multidisciplinary approach to surgery needed?
- operations management - For example, employers are looking for consumer satisfaction which may include accessibility and alternative medicine.

Changes in the British Health System

Mistry (1997, 1) says the focus of patient illness has moved to chronic degenerative diseases which cannot be managed by inpatient care alone. In 1985 Alain Enthoven, an American economist, said that the NHS would face continuing pressures due to an ageing population and the increasing costs of medical technology. He suggested that services must be improved within the available structure. However, barriers to this include the professional staff within the system and a lack of incentives to manage better. When economic constraints began to hit, wards were closed and non-emergency admissions reduced. As a result of unfavourable publicity the government allocated an additional 101 million pounds and a review of the NHS was commissioned. This resulted in the White Paper “Working for Patients” and in 1990 a number of reforms were in place. These separated the roles of purchaser and provider, created self-governing NHS trusts, transformed district health services into purchasers of services, and introduced GP fundholding and contracts of service between purchasers and providers.
Chapter 2 – Environmental Context

Underlying the reforms was an element of competition and a focus on the needs of the patient. District health authorities were to buy services on behalf of people living in their area. Fifty-seven NHS trusts were established in England in 1991 and by 1994 over 90% of all services had trust status. Initially the performance of trusts was monitored by the NHS Management Executive; now this is done by small regional outposts. These monitor financial performance and approve annual business plans.

GP fund holding covers the contracting of hospital services, district nursing, chiropody, and services for people with mental illness and learning disabilities. District health authorities are allocated funding based on:

- the age of the population;
- health and socio-economic indicators from the census;
- higher costs of providing services in certain areas (e.g., southern UK).

Most funding to GPs is not benchmarked but based on “historical level of activity for individual fundholders costed at local provider prices”.

**TYPES OF SERVICE CONTRACT**

*Block contracts:* The District Health Authority or GPFH pays the hospital (or other provider) an annual fee in instalments for the provision of a range of services defined in terms of overall workload and costs. Small changes in the number of patients treated do not affect the cost of the contract.

*Cost and volume contracts:* Payment is guaranteed up to a percentage of contractual workload and thereafter is based on the actual numbers of patients treated.

*Variable contracts:* Payment is made on a cost-per-case basis and is used to fund individual treatments outside the terms of a regular agreement. GPFHs make extensive use of this facility.

*Extra contractual referrals (ECR’s):* These are all treatments for which no contract has been agreed. DHA’s keep a reserve to cover their cost and all emergency ECR’s are paid automatically. Any consultant can refer a patient to another consultant without seeking prior permission of the DHA. Non-fundholding GPs need to seek approval from the DHA before referring patients out of the local area for non-emergency treatment.

Contracts with DHA’s were initially priced on a cost-per-case basis by speciality, with only limited analysis at the sub-speciality and casemix level. Work is now going on to develop a common costing approach. While quality standards are built into most contracts, they are mostly non-clinical in nature. The most common are waiting times, patient satisfaction and undertaking clinical audits.

The impact of competition was most strongly felt by major city hospitals. However, the scope of competition changes at the regional level where a purchaser may be able to use only one provider.
COMMUNITY CARE

At the same time the government introduced changes to community care via the Community Care Act of 1990, which was not implemented until 1993. Local authorities were to be “enablers” rather than direct service providers; they would assess an individual’s need for care and work with GPs to determine what services were necessary. The boundaries between acute and community care are shifting as care previously provided in acute hospitals is increasingly delivered in people’s homes, or in community or primary care settings. The shift in the balance of acute sector provision is being made possible by developments in pharmacology, medical technology, anaesthesia and minimal access surgery. Their influence is combining with cost improvement measures to reduce lengths of stay, increase day surgery rates, and enable conditions to be managed outside of the traditional hospital setting (p6). Health authorities have also merged.

In 1995 GP fundholding was expanded to include three levels:

- **community fundholding** - for small practices of 3,000 patients. These purchase drugs, diagnostic tests and community services but not acute hospital treatment.
- **standard fundholding** - for 5,000 patient practices. These purchase all elective surgery, outpatient and specialist nursing services.
- **total purchasing** - GPs purchase all hospital and community care for their patients, including A and E services.

Osteopathy, chiropractic and patient transport services to surgery are also being piloted within standard fundholding.

Health authorities are responsible for assessing the health care needs of local populations and developing integrated strategies for meeting needs of primary and secondary care. This includes advising on budget allocations to GP fundholders and monitoring the way GPs fulfil the provider and purchaser role; ensuring that the national and local strategies are implemented; providing GP support through investment, training and advice; and direct purchasing of those services needed for a broad population base.

The UK government also produced Health of the Nation papers in 1992 which identify five key areas targeted for improvements in health. These are cancers, coronary heart disease, stroke, HIV/AIDS and sexual health, accidents and mental health. Targets relate to changes in lifestyle or mortality.

The Move to Fundholding in Australia

Fundholding is also being encouraged in Australia. Rosenthal (1996) suggests that this is based on the beliefs of health policy developers and not on an agreement between funders (government), providers (the medical profession) and patients about how best to improve health care. A number of commentators (Pritchard et al, 1996; Bollen, 1996) have pointed out that there are significant differences between the UK and Australian health systems that lead to the fundholding being quite different in the two countries. In the UK patients are registered with a GP practice. In Australia patients have autonomy to choose whichever GP they wish.
Time required for managing fundholding is considerable. In the UK this does not affect GPs income as it is linked to list size, and staffing costs are reimbursed at 70% of cost to GPs. However, in Australia staff costs are paid entirely from consultation fees. Australian GPs would have to spend time away from consultations to address the management of fundholding. This will have a serious impact on rural GPs who currently have demanding practices as a result of a shortage of rural doctors. Evidence from the UK also suggests that fundholding practices need two to three extra support staff.

Enthusiasm for GP fundholding in the UK was linked to increased power for GPs to improve the health care of patients and a changed relationship with secondary health care providers. In Australia the relationship of GPs to other health providers is different. GPs in Australia have much greater control over specialists in the private sector although they may have problems getting patient access to public hospitals. There is concern that with fundholding the doctor is required to act as both agent for the patient and purchaser of the patient’s health services. This could involve a conflict of interest, especially if personal income is affected.

Currently, there is little evidence that fundholding improves health care or reduces costs. Different stakeholders involved in fundholding would require different quality of care measures. The development of best practice guidelines for clinical care may allow outcomes to be better defined and national cost/efficiency benchmarks developed. This may mean resources can be used more efficiently without the need for fundholding. There are also concerns that costly, chronically ill or elderly patients may be discriminated against under fundholding.

**THE PATIENT’S CHARTER**

In the UK in 1991 a charter was introduced to make the public service more responsive to consumers (Mistry, 1997). The Patient’s Charter puts these principles into practice in the NHS and states that the patient has the right to:

- receive health care on the basis of clinical need, regardless of ability to pay;
- be registered with a GP;
- receive emergency medical care at any time through a GP, emergency ambulance services, and/or hospital accident and emergency departments;
- be referred to a consultant acceptable to the patient when a GP thinks that this is necessary, and be referred for a second opinion if the patient and GP think this is desirable;
- be given a clear explanation of any treatment proposed, including any risks and alternatives;
- have access to health records and know that those working for the NHS are under legal duty to keep their contents confidential;
- choose whether or not to take part in medical research or medical student training;
- be given detailed information on local health services, including quality standards and local waiting times;
- be guaranteed admission for treatment by a specific date no later than 18 months from the date when a patient is placed on the waiting list;
- have any complaint about NHS services investigated and receive a full and prompt written reply from the Chief Executive or General Manager;
- be informed if he/she is to be admitted to a mixed-sex ward.
THE FUTURE OF HEALTH CARE

Mistry (1997, 2) has suggested that integral to the new health care system will be a paperless world. Patient records will be input from handheld or bedside devices. In 1995 hospitals in the UK started the implementation of computer networks which will carry telephone calls, computer data and eventually multimedia messages. She describes the development of “super hospitals” which deal with sicker people in a catchment zone of around 2 million. There are some difficulties to be addressed with this vision. For example:

- Access to facilities will be an issue for the elderly.
- New technologies will require new skills and will change existing professional boundaries within hospitals.
- Medical education will have a stronger primary care focus.
- Changes in medical roles need to be accepted. The traditional demarcations between medical and nursing professions will blur as nurses develop new responsibilities as care managers for patients.

Draper and Shani (1993) suggest that in a patient-focused system hospital structures will be very different. There may be:

- acute care centres with five or six operational units. These would be like mini-hospitals with their own operating theatres, intensive care, radiology, ultrasound, laboratory, pharmacy, administration and support services. Patients would be admitted, treated and discharged from this unit. For example, the estimated optimal size for adult general surgery is 100 to 130 beds, two or three operating theatres, an endoscopy room, one X-ray room, a laboratory unit and ultrasound facilities.
- a day-care diagnostic centre with outpatient clinics, rehabilitation and day surgery.
- each outpatient clinic would have multi-function rooms for examination and blood tests. Rehabilitation would be closely associated with outpatient clinics.
- a diagnostic unit where a CT scanner, MRI and pathology services will be grouped together and will be a referral unit for hospital units and GP services.
- support services where computing and laundry will be centralised and much smaller.

They claim this structure will require 15% less floor space but will increase equipment costs by 40%. However, they estimate these to be 10% less than for a conventional hospital.

Currently in the UK, purchasers are being given the responsibility of building standards into contracts in five areas: referral and diagnosis, coordination between delivery at different levels of care, management of treatment, outcome, and prevention and early diagnosis. They are also to implement the vision of modern health care where competition is to be encouraged and the central government interferes only to help with mergers, assist providers in difficulty and prevent collusion.

Mistry (1997, 3) says, “In a truly competitive market the organisations which survive and prosper are those which provide the services or products which the consumer needs or wants, at an acceptable level of quality and at a fair price. This market position is achieved through the organisation’s managers understanding the market, anticipating their needs, and gearing up their organisation to provide them. In this respect, acute care managers cannot afford to sit back and wait for purchasers to run the show. They need to be proactive and not reactive …”
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There are social implications from these changes. Many purchasers are not prepared for the role thrust upon them, and there is variation in competency of purchasers. When a service is discontinued it is the hospital manager who experiences the wrath of the public and employees, not the purchaser.

New Zealand
A case in point is that of New Zealand (Malcolm, 1998) which introduced radical health care changes. In 1993 Crown Health Enterprises (CHEs) were set up to replace area health boards. Health boards had only been implemented in 1989 and were to integrate the services of public and private hospitals, non-profit health sectors and GPs. CHEs were designed to function as commercial enterprises and were required to bid for funding (along with other health providers such as GPs, and nursing homes) from four purchasing regional health authorities (RHAs). CEOs of CHEs were generally appointed from the private sector. Their lack of health management experience often led to clashes with medical staff. With a change of government in 1996 a single funding authority was instituted: the national Health Funding Authority (HFA). The CHEs are being converted back to healthcare and are no longer expected to produce a profit.

In primary care a series of successful innovations took place. Independent Practitioner Associations (IPAs) were formed based on an idea from the US. Their purpose was to protect the status of GPs and to help them become more effective in their negotiations. They then became more focused on improving quality health care, access to care and health of patients through primary health care. Contracts offered to IPAs initially were for laboratory and pharmaceutical services. Most members made savings that were generally then allocated to health promotion programs. They have developed accountability, collaboration and peer review.

In 1996 it was realised that the commercial aspects of the reforms had failed and the four purchasing RHAs were replaced with a single funding authority - the national Health Funding Authority.

Health Care in Australia
Concern about the rising costs of health care have a history in Australian health care literature with reports such as the Commission of Inquiry into the Efficiency and Administration of Hospitals in 1980. This report noted a lack of clear objectives, inefficiencies in the system, problems with data collection and disincentives to improve efficiency.

In a government position paper Macklin (1991) suggested that an integrated health care system should be developed in Australia with clear delineation between Commonwealth and State responsibilities. There should be:

- incentives for best practice care
- incentives for productivity and efficiency
- scope for substitutability and flexibility
- service models which encourage continuity of care
- selective use of market and competitive pressures
- equity in distribution of health resources
- devolution of administrative and service delivery
- clear roles for and accountability between different levels of government
Macklin outlines the most prevalent disabling conditions as being those of musculoskeletal and connective tissue, hearing loss, circulatory disease, respiratory diseases, mental disorders, nervous system diseases and sight loss. The numbers of these conditions are expected to increase through the effects of an ageing population, increased self-reporting and increased incidence. These conditions require a mix of hospital, diagnostic, general practitioner, allied health, pharmaceutical and community care services.

Allied health, community nursing and community care services are being provided through a wide range of programs and service agencies which include the Home and Community care program, public hospital outpatient and outreach services, community health and community mental health services, and private allied health providers. However, the 1986 ABS Census showed that most allied health practitioners work in hospitals and private practice, while very few work in community settings. Chiropractors, physiotherapists and podiatrists are most likely to be in private practice, while occupational therapists are least likely to be.

It has been estimated that 50% of Australia’s health care expenditure goes on 10% of the population with chronic illnesses. The limited availability of allied health and nursing services, it is claimed, leads to overuse of medical services and drugs (Talbot, 1997).

**TRADITIONAL FORMS OF ORGANISATION FOR ALLIED HEALTH PRACTITIONERS**

Traditionally, allied health personnel have been grouped in the hospital setting in a single-profession department, headed by a senior member of the profession. Usually the department head is responsible to the medical clinician manager, where the hospital is based on medical speciality or program. Alternatively, the professionals report to a medical administrator at the corporate level of management. This organisational structure has stressed function and a profession-centred approach to maximise technical expertise. Often allied health professionals provide services across the organisation in units or teams within the hospital. Allocations to these are made through matching departmental resources with negotiated service priorities. Budgetary control for the service has resided with the professional department.

Boyce (1993) maintains that 15% to 20% of patient care services in hospitals is provided by allied health practitioners. Yet allied health practitioners have not had the opportunity to have substantial input to hospital reform. Turner (1989) has criticised the White Paper “Working for Patients” (1989) because he maintains it ignores the multi-disciplinary nature of health care and perpetuates the idea that health care is only about doctors and nurses.
2.2 CHANGES IN THE FUNDING OF HOSPITALS

DRGs: THEIR DESIGN AND DEVELOPMENT

As early as the 1900’s Eugene Codman, a surgeon at Massachusetts General Hospital in Boston, had suggested that hospital reporting should not be an account of how the money was used but about what happened to the cases. He believed that hospitals should provide reports in a uniform manner so inter-hospital comparisons could be made. He did not gain popular support for this concept at the time.

The idea of DRGs was not for funding but to allow hospital management a way to measure and evaluate hospital performance. The development of modern DRGs in hospitals in the US began in 1967 when hospitals were asked to provide utilisation reviews and quality assurance as conditions for receiving Medicare funds. Physicians asked whether an industry model could be applied to hospitals.

Since patients have numerous and varied medical conditions, computer technology was needed to simplify the detection of patients with similar conditions. For this purpose the production line analogy, utilising the cost/quality curve, was suggested. Here achieving technical superiority is generally seen as spending more money on equipment, hiring more highly skilled labour, and so on. However, there is a limit to increasing technical excellence by increasing spending. Inherent in the cost/quality ratio is the value people place on the product. The producer wants to establish optimal quality, which is the point where quality exceeds cost to the greatest degree.

Fetter (1991, 1) argues that health consumers do not have the information on which to assess value and quality and in most cases do not pay directly for the services they receive. This removes the incentive for hospitals to minimise costs and distorts market forces which operate more effectively in other industries. DRGs can give some indication of cost benefit. However, in order to ensure that a ceiling on revenue would not result in low quality output, peer-review mechanisms must be established.

THE HOSPITAL AND ITS PRODUCTS

“The major function of a hospital is to provide the diagnostic and therapeutic services required by physicians in the clinical management of their patients. In doing so, the hospital also makes available certain hotel and social services.” A hospital, according to Fetter, has two distinct production functions:

- to convert raw materials (labour, supplies, equipment) into standard outputs (meals, clean linen, medications); and
- to attend to human beings who have a medical problem/disease/disorder, and to evaluate and treat with other professionals the problem and the patient. The institution then provides goods and services to diagnose and treat the illness.

The main problem for hospitals is to separate issues of efficiency in the production of standard outputs from effectiveness in the utilisation of these products.
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The purpose of DRGs is to identify the cost of delivering services and to let managers know how to estimate costs. However, there are three variables:

- Not all diseases are equally well understood, nor are they all easily defined.
- Although there can be patterns of practice for treating a disease, treatment of many diseases varies between practitioners.
- In any coding system there will be problems with using descriptive labels.

There will be variability in the utilisation of goods and services in treating a given disease or illness. What is needed is a mechanism to predict variability. In order to determine resource utilisation Fetter used discharge data. Four elements were originally factored in to DRGs:

- class definitions based on hospital abstracts; that is, the information routinely collected by the hospital (e.g. sex, age, principal diagnosis, secondary diagnosis, surgical procedures performed);
- a manageable number of classes;
- patterns of resource intensity within a given class; that is, although the precise resource intensity of a particular patient cannot be predicted by knowing the DRG to which the patient belongs, the average pattern of resource intensity for a group of patients in a DRG can be predicted;
- similar types of patients in a given class from a clinical perspective.

The initial DRGs (up to version 4) relied on principal diagnosis - the condition which had brought the person to an acute care hospital. These were categorised using organ-system involvement and there were 23 categories called “major diagnostic categories”. These categories included 10,000 individual ICD-9-CM (International Classification of Diseases, 9th Revision, Clinical Modification) diagnosis codes. In 1979 hospitals in the US began coding all surgical and diagnostic procedures using these codes.

It is expected that at any one hospital the process of care for an illness will exhibit a stable and predictable pattern. Where it does not the causes can then be identified. Costs can be compared across DRGs, intermediate services, DRG clusters, time periods and institutions.

Cost differences can be the result of prices (labour, materials), volume of patients, casemix (types of patients treated), efficiency (use of input factors) and/or treatment effectiveness (variations in physician practice).

Casemix complexity refers to distinct patient attributes:

- **severity of illness**: relative loss of function and mortality that may be experienced by patients with a particular disease;
- **prognosis**: the probable outcome of an illness, including likelihood of improvement or deterioration, likelihood of recurrence and probable life span;
- **treatment difficulty**: patient management problems for a particular illness (for example, those requiring technically difficult procedures or an unclear pattern of symptoms);
- **need for intervention**: the severity of illness that lack of continuing care would produce;
- **resource intensity**: relative volume and types of diagnostic, therapeutic and bed services used in the management of a particular illness.
Implementing a product line approach requires a change in the organisation and management of hospitals.

REFINEMENTS TO DRGs

A hospital having a more complex casemix from a DRG perspective means that the hospital treats more patients who require more hospital resources but not necessarily that the hospital treats patients having a greater severity of illness, greater treatment difficulty, a poorer prognosis or greater need for intervention. For example, terminally ill cancer patients have poor prognosis and are severely ill but require few hospital resources apart from basic nursing care.

Medical technology and treatment practice changes mean that the DRGs will need to be continually refined. Severity of illness was one particular area that attracted attention because DRGs did not account for severity of illness. A number of other tools were developed such as disease staging, the severity of illness index, “patient management categories,” the Medical Illness Severity Grouping System, and the Acute Physiology and Chronic Health Evaluation (APACHE). Each is based on a different concept of severity such as “risk of death” and “total burden of illness”.

Disease staging, for example, sees disease severity in terms of biological progression and complications such as infection or obstruction. Diseases are first assigned to one of 420 staged disease categories and are divided into four levels:

- conditions with no complications
- problems limited to the organ or system
- multiple site involvement
- death

They were then defined using combinations of diagnostic codes from ICD-9-CM. These tended to show homogenous resource consumption.

Horn’s Severity of Illness Index (SII) is a four level severity score based on seven variables:

- stage of the principal diagnosis
- concurrent interacting conditions
- rate of response to therapy
- impairment remaining after therapy
- complications of the principal diagnosis
- dependency on hospital staff
- extent of non-operating room procedures

A second generation version of Horn is called the Computerised Severity Index (CSI). This measured severity of illness in terms of the patient’s total burden of illness. These were interlinked with 700 diagnostic categories and had four levels of severity in each group. DRGs were refined in line with some of these issues. In 1997 in Australia DRGs were re-examined in order to develop expanded definitions (Talbot, 1997).
COST ACCOUNTING AND BUDGETING

Chandler, Fetter and Newbold (1991) outlined how cost accounting can work. Departments can work out how many minutes of labour are required to produce a meal or the costs of materials per radiological examination. Costs can be allocated to a patient, for example, by summing costs of each procedure or laboratory test, the number of hours of nursing care and the quantity of materials and services utilised. Costs can be combined over all patients in one DRG in order to get an aggregate score. The scores can then be used “to monitor and evaluate the cost performance of physicians, and to develop budget projections based on casemix. Cost data can also be used to manage efficient production of services and to set prices for services and types of cases.”

The costing of services depends on a product line. In medicine and psychiatry it is more difficult to define a product because the patient may be in only for observation. In this case they suggest basing costs on the number of hours of nursing care and the number of consultations. Hospitals have to generate their own statistics for outpatients. Costings for DRGs can be compared to other hospitals and year-to-year variations looked at. Estimates can then be made for the coming year of the number of patients with a particular DRG who will be seen and relevant costs estimated. Variable costs have also to be identified; these are costs that change with patient volume. Fixed costs do not vary with patient volume.

Budget forecasts need to be made based on inflation, predicted casemix changes, new technology (machinery) and changes in medical practice (such as a new drug being trialed, or changes in prescribing practices). These can then be compared with actual costs and a detailed examination of cost variance can take place.

Ways of Calculating Costs

Cost-to-charge ratio: Costs are compared with patient service charges. Total costs are calculated for a particular service and then compared with total patient charges for the same service. A cost-to-charge ratio is calculated and this becomes a statistic for calculating costs. For example, suppose a food service centre had costs of $500,000 for a particular year and total charges for meals were $700,000. Then the cost ratio is $500,000 to $700,000, which is 0.71. If the patient had a meal charge of $4.25 the costs allocated to the meal would be calculated as $4.25 x 0.71 and is thus $3.02.

Weighted length of stay: Length of stay is convenient for allocating costs for services used daily. The cost of a single unit of service can be estimated for patients in each of the DRGs and then costs are allocated on the basis of the number of weighted bed days. The Yale study in 1987, “Diagnosis Related Groups (DRGs) and Nursing Resources,” showed it was possible to arrive at length-of-stay nursing weights for each DRG.

Actual cost: For some items actual costs are known and can be allocated to patients directly. In the case of medications, if the cost of one unit of drug A is $15.00 and indirect pharmacy costs (such as heating and administration) are $8.00 per unit of medication, the cost of one unit of medication is $23.00.
Relative value units (RVU’s): Relative value units are weighted measures of resource consumption based on the relative amount of time and materials required to produce a particular service. They can be developed by assigning a base weight to the least expensive procedure and calculating the relative weights of other procedures.

\[
\text{weight of procedure } X = \left(\frac{\text{weight of least expensive procedure } Y}{\text{cost of procedure } Y}\right) \times \left(\frac{\text{cost of procedure } X}{\text{cost of procedure } Y}\right)
\]

Even though total hospital costs will change, RVU’s will remain approximately constant from year to year. To allocate costs for a particular patient, sum the appropriate departmental RVU’s for each procedure performed, multiply this by the total departmental costs and then divide by the sum of products and RVU’s for the department.

For example, in a department which had total costs of $500,000 and the sum of products and RVU’s for the department was 47,389.25, costs for a patient who had three tests of type Y (where tests of type Y have RVU of 3.27) are calculated as:

\[
\frac{500,000 \times 3 \times 3.27}{47,389.25} = 103.50
\]

Standard cost: Unit costs are calculated for all of the materials and labour in a department. The number of units of each of these categories that are consumed in performing a particular procedure is then calculated, and the standard cost can be found by summing up the products of unit costs and units consumed.

COST VARIANCE ANALYSIS

Fetter, Harms and Fetter (1991) describe cost variance analysis. Cost variance analysis looks at the three possible sources of variance between budgets and actual costs. These sources of change may be:

- the case-mix of the hospital
- the practice patterns of the hospital staff
- the operating efficiency of the hospital’s departments

If a facility used 1,000 hours of labour when only 900 hours had been budgeted for and the actual labour cost was $5.00 per hour, instead of the budgeted cost of $5.50, then the net result is spending an excess of $50.00 for labour. The +$50.00 is an unfavourable efficiency variance of $550 (more hours used than expected) and a favourable price variance of $500 (the price paid per hour was less than expected). Although the result was a net variance of +$50 this analysis shows that two factors were responsible.

The analysis may use three factors by considering volume of production. Volume variance is calculated by holding hours and unit price at the standard values. Efficiency variance is calculated by holding volume at actual value and unit price at standard value, then varying the hours per unit. Within this framework hospitals should do product-line management to screen a hospital’s products and include an evaluation of the following:

- personnel skills available
- equipment available versus equipment required to deliver services
- costs and revenues by DRG to determine where the hospital is competitive
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- needs of populations in the service area
- physician specialities as a means of determining the kinds of services being provided and needs of patients.

This may mean certain hospitals specialise in a particular service.

**HOW TO DEFINE A SERVICE/CATCHMENT AREA**

The catchment area may be influenced by the reasons people come to a particular hospital or service: either because of the specialities offered at that location or the prohibitive distance to another service, or both.

The most comprehensive way of checking where patients come from is to use postcodes for inpatients, outpatients and day cases for each speciality. Postcodes of referring GPs can be used, although in the city where there are many GPs in close proximity this method may not be particularly informative about patient origins (Mistry, 1997, 4).

After analysing this it is necessary to develop a detailed profile of the present and forecast population (for which government census data may be used). Information can also be obtained on births, deaths by cause, infectious diseases, infant mortality and employment forecasts. General characteristics of the population can be identified such as age distribution: more elderly patients will mean more falls and chronic diseases; economic status will affect the ability to utilise health services and maintain healthy standards of living; car ownership may influence access to service locations. The NHS carried out an epidemiologically based healthcare needs assessment in 1994 reported in Stevens and Raferty. This considered medical conditions such as stroke and diabetes.

**PATIENT CLASSIFICATIONS**

In the UK, Healthcare Resource Groups have been developed by the National Casemix Office because of a dissatisfaction with the US-developed DRGs. Purchasers and providers are expected to use HRG costs as a basis for contracts or for establishing contract prices.

*The Patient Administration System* (PAS) can provide information on the number of:

- new outpatient visits
- follow-up outpatient visits
- elective admissions
- emergency admissions
- day cases and day cases as a percentage of all electives
- A and E visits

as well as on the average length of stay for each type of admission. Mistry suggests these should be monitored in three year cycles.

*Ward Analysis:* This is not done by all hospitals but can indicate when beds were closed and when beds were under-utilised or over-utilised. The analysis can include:

- number of bed days and their allocation by speciality/consultant
- the average number of beds available
- the total bed days used
- the average percentage occupancy
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- the average length of stay by speciality/consultant
- the number of day cases by speciality/consultant
- the number of bed days used by each consultant

Although average lengths of stay are coming down, they are already slowing down and there will come a point when they cannot be reduced further.

A bed census can also identify good and bad practices. The problems identified might include poor admission policies (i.e. the patient should not be admitted) or delayed discharge as a result of:

- lack of placement options
- lack of hospital resources (e.g. physiotherapy)
- delays in scheduling diagnostic tests such as X-ray
- the hospital attendance roster of a consultant
- lack of patient transport

The UK Audit Commission suggested that there should be different types of beds in hospitals:

- observation beds
- admissions wards
- five-day medical wards
- planned investigation units
- patient hotels

**OTHER TYPES OF PATIENT CLASSIFICATIONS**

**Classification Ideas for Ambulatory Patients**

Schneider et al (1991) outlined how ambulatory visits to hospitals and GPs might be classified. AVGs (ambulatory visit groups) were designed as well as Reason for Visit Classification (RVC), a method for categorising patients’ complaints, problems or reasons for seeking ambulatory care. This utilised seven modules: symptom, disease, diagnostic screening, preventative treatment (medical counselling, rehabilitation, surgical aftercare, injections, medications, desensitisation to allergens), injuries and adverse effects, test results and administration. The emphasis is on the patient’s reason for seeking care. These groups were based on the body system affected and could be linked with MDC.

Paediatric groups followed ICD-9-CM diagnostic codes so that mental disease and disorders and substance abuse were handled differently. Six AVGs were developed for psychiatrists. These classifications were devised to help with outpatients specifically.

**Patient Dependency Groups**

Brand et al. (1991) stated that in a nursing home nursing care is the single biggest expense. Research was conducted into classifying patients by observing patients’ behaviour and mental status, and their level of dependency (such as disease, toileting, amount of help needed). Costing was worked out by recording nurse and nurse aide times and a “unit of service” concept developed for different facilities.
Different groups were defined using the level of help required to eat, dress transfer, and the level of control of bladder and bowel function.

**Read Clinical Codes**

James Read in the UK developed a system of clinical codes for GPs based on ICD9 and OPCS (a classification of surgical operations and procedures similar to the CMBS). The 1995 version (Version 3) has 150,000 codes; however, many of these are thought to be not applicable to Australian practices and thus assignment of consistent codes can be difficult. The Australian government has not bought a National licence for the codes. The codes are being used in general practice in the UK and are being trialed in New Zealand in primary and secondary care. (Britt, Beatton and Miller, 1996)

**International Classification of Primary Care (ICPC)**

In 1978 WHO in conjunction with WONCA (World Organisation of Family Doctors) produced ICHPPC2. It is based mainly on body systems with a chapter on ill-defined conditions (such as feeling tired, feeling ill), one for social problems and another for psychological problems. It allows for specification of diagnosis/disease, test results and checking. The advantage of this system is that it follows the natural process of primary care and allows for generation of meaningful morbidity groups; however, less common problems are not easily coded.

The Family Medicine Unit at the University of Sydney developed an extended version (ICPC Plus) based on data recorded by GPs and collected during the Australian Morbidity and Treatment Survey (AMTS), the Country-Metropolitan Comparison Study and the Morbidity and Therapeutic Index. The ICPC Plus allows for extension terms and is updated quarterly. In 1996 it was being used by 44 general practices in Australia, the Department of Veterans’ Affairs for Health Care Plans and the National Hypertension study. A feasibility study of its application to Community Health Centres is being carried out, as well as it being considered by RFDS, Aboriginal Health and Victorian Community Health. Under Federal Government funding it is also being linked to ICD9.

**Snomed**

This is a classification system that has its origins in pathology. It can develop highly specific codes but is not widely used in general practice.

**UMLS (Universal Medical Language System)**

This uses medical and scientific terms originating from terms used in Medline. It is being used experimentally in the US.

**Docle**

This is an Australian developed system which condenses terms into abbreviated forms. Again it is not widely used.
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Allied Health Classification Systems

In April 1998 the South Australian Health Commission (SAHC) and the Commonwealth Department of Health and Family Services (CDH and FS) released a report on ambulatory classification and cost weights to be used in funding and evaluation of ambulatory services in public hospitals. This report is entitled Outpatient Costing and Classification Study incorporating the Developmental Ambulatory Classification System Evaluation.

A sub-committee of the Australian Casemix Clinical Committee developed a classification system called the Developmental Ambulatory Classification System (DACS). This was based on Ambulatory Major Diagnostic Groups and was designed to complement other patient classification schemes. The AMDG’s are split into whether the patient is presenting for a new or repeat visit, and whether a significant procedure has been performed.

Patient encounters were defined as an “interchange” between one or more health care providers and one or more patients, for assessment, consultation and/or treatment for an intended unbroken period of time”. This embraced all patients seen within a hospital-based outpatient or emergency department. For allied health the survey was to include hospital-based, non-admitted patients. Emergency departments were to be separately analysed.

The results of this study were that generic clinic-based classification worked better than patient-based data (DACS and patient diagnosis data). This accounted for 31% of variation in total cost. The recommendation of the report was that generic clinic classification be used for Allied Health and Outpatient Clinics.
2.3 IMPACT OF CHANGES TO THE HEALTH CARE SYSTEM ON THE HEALTH PROFESSIONS

NURSING AND DRGs

Thompson and Diers (1991) wrote that nursing diagnoses change daily and during a day as the patient’s condition changes (for example, development of constipation or an increase in pain levels). There are variations in patient needs and levels of nurse training. ICU must be classified separately from general nursing care because the ratio to patients is very high, i.e. 1:1 or 1:2. On average ICU patients receive 17 hours of nursing in every 24 hours. Burns units also have higher costs. Only hospice care and in-hospital birth centres do not have higher costs. Trauma patients may have high levels of nursing needs which may not decrease significantly because these patients may retain disabilities. Terminally ill patients may require low levels of care until the illness progresses. “Outliers” (those who did not fall within typical time frames for treatment) were often very sick children aged under three and those adults over 55 who had exhausted domestic and institutional resources, often staying in hospital up to 55 days.

In trying to identify nursing patient classification three models were put forward:

- **prototype**: This consists of a relatively small number of “typical” patient characteristics to which a given patient is matched.
- **task documents**: These are lists of nursing activities applicable to a given patient such as mobilisation, administering medications and monitoring (e.g. the San Joaquin system).
- **critical indicator systems**: These label patient conditions rather than tasks; the conditions are weighted and a total score calculated. These are often then collapsed to identify one of four levels of care.

All these are criticised because it is said they do not measure the professional component of nursing practice: observation, assessment, and decision making activities.

*Nursing minutes* can be calculated. However, there are some nursing activities that do not involve direct patient contact (such as charting, preparing medications, arranging transfer) and others that cannot be allocated to one particular patient (such as change of shift reports, stocking treatment rooms, checking narcotic counts). There are also non-patient-care times such as lunch breaks, off-ward conferences or meetings. Time can be classified as “direct” or “indirect” patient care.

*Nursing intensity*: It has been found that some patients need more nursing care even though they are not treated aggressively with high technology or drugs. Some patients who are very sick may require low intensity care because machines do much of the work.

THE EFFECT OF THE DRG SYSTEM ON DOCTORS

Averill and Kalison (1991) outlined how prospective payment does not include payment for physician services. Hospital prospective payment creates strong financial incentives to reduce hospital bed-day utilisation. Hospital management must reduce operating expenses in concert with physicians reducing average resource utilisation per patient.
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To do this physicians have to review practice patterns. “The current practice of reimbursing physicians on the basis of a portion of the actual, customary, prevailing or reasonable charge for a service is in conflict with the incentives in hospital prospective payment. Physician reimbursement on this basis provides physicians with incentives to provide more services and consume more resources when treating patients.” Thus a prospective payment system needs to be developed for physician costs.

There are two approaches to developing a prospective payment:

- **Fixed payment:**
  - establish a scale based on prevailing charges;
  - determine the production costs (physician time and overhead adjustment for speciality training) associated with each service and base a fee scale on those findings;
  - create competitive market forces among physicians in a geographic area by encouraging them to submit the amount they would charge to render a specific service.

- **Development of a physician payment component for each DRG:**
  - Using historical data the average physician’s fee for each DRG can be computed and adjusted for regional wage differences. This would then reflect the individual physician’s casemix and would provide an incentive to render services effectively and efficiently. For this to be useful a measure of severity of illness becomes more important.

These payment methods are not linked to quality of care. The next step in prospective payment is payment for quality of care. This would mean that hospitals or physicians who have a high complication rate may be penalised. The writers advise care in adopting this concept because it may mean that a hospital may then not have funds to correct a problem and quality may deteriorate further. One suggestion is to publish hospitals’ quality measures and allow consumers to choose between hospitals.

**The Future of Allied Health Professions**

Bezold (1994) suggests that treatment of disease will change radically in the next decade: vaccines may be available for cancer and a pill may “melt” plaque on artery walls. DNA fingerprinting may well be included in medical records.

Health therapies, programs of care and professional advice will be facilitated by computer technologies which will improve practitioner outcomes. Most fields will be able to take the best knowledge of clinicians and make it available to others.

Bezold suggests that there are four factors in morbidity: medical care, the environment, patient behaviour and genes. Variance of 50% in morbidity is related to behaviour, 20% to environment, 20% to genes and 10% to medical care. Thus, allied health professionals should be targeting the 50% lifestyle issues and “coaching” people to improved health.
“Soft technologies” will also grow. People will increasingly use thoughts and actions as a means of improving their health. For example, they may adopt new diet, exercise and stress management behaviours to effect desired changes. Some health professionals are already moving into these “mind/body” approaches.

Marketplace judgements of quality and competence, design of delivery systems and choice of health professionals will impact on allied health. Allied health professionals have to be aware of the value of their service compared to any other. Continuous learning will be part of the 21st century and accreditation requirements will change.

**PEW HEALTH PROFESSIONS COMMISSION**

In the US the Pew Health Professions Commission (ASHA, 1994) recommended that allied health training schools should recognise the growing focus on prevention, family involvement, primary care and multicultural issues. Training should strengthen ties between work sites and classrooms, preparing students to work in managed care settings, to supervise support staff, and to impart the importance of efficacy and cost containment. Task-specific training should be provided by employers and more general training provided by colleges. Discipline-specific accreditation models should be changed to decrease fragmentation within allied health specialities.

The Commission’s first report, entitled *Healthy America: Practitioners for 2005*, listed 17 competencies that all health practitioners should possess; ie. they should be able to:

- expand access to effective care
- provide contemporary critical care
- care for the communities’ health
- emphasise primary care
- participate in co-ordinated care
- ensure cost effective and appropriate care
- practice prevention
- involve parents and family in decision making processes
- promote healthy lifestyles
- assess and use technology appropriately
- improve the health care system
- manage information
- understand the role of the physical environment
- provide counselling on ethical issues
- accommodate expanded accountability
- participate in a culturally and racially diverse society
- continue to learn

The second report of the Commission, entitled *Health Professions for the Future: Schools in Service to the Nation*, recommended changes to professional associations and higher education institutions, and policy changes at federal and state government level.

Allied health is the largest group of health professionals in the US (Finocchio, 1994) but is comprised of a number of disciplines that do not necessarily perceive a need for integration and collaboration. The Pew Commission had an Advisory Panel for Allied Health which recommended six strategies. These were:
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Strategy 1: To explore models for unifying parts of allied health professions to integrate clinical service and education through:

- collecting educational and practice data;
- conducting a strategic planning project on the future of allied health;
- implementation of model curricula based on a new core with major and minor areas of study;
- establishing an improved national association for allied health educational programs.

Strategy 2: To encourage the continuous validation of clinical practice through:

- centres of excellence for faculty development in research, clinical practice and teaching-learning;
- clinical scholars programs;
- continuing competency requirements/programs;
- unification of academic and clinical resources and experiences;
- curricular emphasis on primary care and prevention.

Strategy 3: To improve linkages between and within allied health disciplines through linkages

- in flexible careers;
- between hospital-based, college and university health programs;
- in health care administration, public health and allied health.

Strategy 4: To explore new avenues for allied health within delivery care systems through:

- the development, testing and evaluation of new ways of utilising allied health workers in care systems.

Strategy 5: To develop institutional accreditation through:

- identification of costs and benefits of current accreditation practices;
- reorientation of accreditation to protect the public;
- accreditation standards which reflect consumer needs and preferences emanating from health care system trends;
- academic schools which have broader programmatic accreditation rather than too specific accreditation;
- development and maintenance of a common accreditation data base.

Strategy 6: To broaden efforts to improve minority representation.

CORE TRAINING STRATEGY

The main challenge for allied health was seen to be the identification of common core areas derived from analysis of the public’s emerging health care needs. The result of this would be to facilitate movement of allied health care workers within their disciplines, provide flexibility in the work setting and better serve the health needs of the public.
Critics of this strategy (Nensteil et al, 1997) have pointed out that allied health professions already respond to market demands: trainees select allied health professions in order to obtain work. Secondly, the demand for services and development of technology in allied health leads to the need for increasing specialisation of services. This runs counter to the notion of “generalists” in the health care field. Nensteil argues that “cross-training” of allied health professionals should be carefully evaluated. There is a difference between just adding a few skills and encompassing the entire scope of a profession (which may not be supported by the market in general). However, individuals may benefit from an additional certification in a particular area in order to better perform their jobs.

Nensteil also argues that in the US there already exists a generalist worker - a physician assistant (PA) who is a:

“health professional licensed to practice medicine with physician supervision. Within the physician/physician assistant relationship, physician assistants make clinical decisions and provide a broad range of diagnostic, therapeutic, preventative and health maintenance services. The clinical role of physician assistants includes primary and speciality care in medical and surgical practice settings. Physician assistant practice is centred on patient care and may include educational, research and administrative activities.”

PA program accreditation takes place through the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Academic qualifications range from Certificate to Master’s Degree. Data in 1994 revealed that 83% of PA students had previously been employed in allied health as nurses or defence force “corpsmen”. The average age of students was 31 years. Estimates by the US Department of Health and Human Services have suggested that 3,000 to 4,000 PAs will be needed annually by the year 2000. Nensteil argues that PAs already allow for allied health workers to become generalists.

PAs are trained in a medical model and supported by the medical community. The majority of PAs work in the primary care fields of Internal Medicine, Family Practice and General Paediatrics. In 1995 34% of PAs practised in communities of less than 50,000 people.

Hull (1992) has pointed out that the scope of what constitutes allied health is very large. There are occupational therapists, physiotherapists, medical records administrators, hospital administrators and various medical technologists. There are also individuals trained in technologies such as electroencephalographic and sonographic technicians, surgical technologists, occupational therapy assistants, physical therapy assistants, unit clerks, radiation and respiratory technicians.

Hull argues that there are a number of ethical issues that need analysis in relation to at least some of these allied health professions. For a PA this may include the need to clarify issues of responsibility. Some questions they need to consider are: How are they an extension of the physician and what should they do if they disagree ethically with certain forms of treatment? What happens if they implement a procedure incorrectly?
Similarly, he argues that the new “team-approach” model has a number of grey areas based on inter-professional conflict, such as such as methods for team-based decision making, assignment of final authority, group accountability and shared responsibility.

**HOW THE COMPETITIVE MARKET MAY AFFECT ALLIED HEALTH**

Little quantification of allied health inputs have been done. However, data from the South Australian Health Commission in 1990 stated that a total of 345,000 outpatient services were provided by allied health.

Few articles have explored the scope for allied health private practice, although some literature exists about the nurse as entrepreneur - a service provider in the open, non-hospital market (Riccardi, 1982).

Boyce (1993) has been one of the first in Australia to examine the possibilities in reorganising allied health. Several mechanisms for purchasing allied health services are suggested.

*Retrospective tracking of service inputs:* A 12-month retrospective tracking of allied health service utilisation by medical speciality grouping can be carried out to establish minimum service profiles. Once activity and resource profiles have been obtained, the quantity of resource can not be reallocated without the agreement of the other party.

*Two-dimensional organisational structure:* This involves a joint system of traditional professional departments and decentralised multi-divisional clinical units. Allied health staff has the responsibility for controlling the unit cost and efficiency of inputs. Clinical units have the responsibility for controlling the volume and casemix of clinical activity. Volumes and casemix targets are set as part of annual agreements.

*Treatment protocols:* Agreed treatment protocols are developed specifying allied health inputs according to patient classification or casemix systems. An agreed price per resource unit is then assigned and matched to the volume targets for the case type in each clinical unit. A budget matched to medical activity agreements is developed.

*Allied health divisions:* In the UK, Sweden and USA allied health groups are clustered into a divisional structure with a fixed budget. These often have a therapy or rehabilitation focus.

*Regional structures:* Allied health departments are amalgamated from several hospitals into a district wide service. Duplicated services are eliminated and professional management is centralised. Pooled budgets and revenues from contracts allow greater spread of overheads and cross-subsidy of some services.

*Purchasing advisory committee:* An allied health consulting committee can be set up to advise on purchasing standards, quality and volume specifications for defined populations.

Boyce suggests that allied health personnel have not marketed their services in relation to patient welfare in an outcome-based framework and therefore may be vulnerable in a deregulated market. If the professions try to ensure an under-supply of allied health professionals then this under-supply may provide an opportunity for new competitors.
and substitute services. Allied health has the opportunity to position itself for contracting either by making itself a provider within an organisation or by contracting directly with purchasers.

Boyce raises the issues of whether, in the new competitive marketplace, information and expertise should be shared with colleagues or sold. The new health structures have implications for competition between professions and challenge historical patterns of task division and hospital management.

NEW OPPORTUNITIES AND CHALLENGES FOR ALLIED HEALTH WORKERS

Case management, a service that attempts to ensure that patients/clients with complex problems and disabilities receive all the services they need in a timely and appropriate fashion, is seen to have evolved from social work practice (Rubin, 1992). Case management function depends on the characteristics of the target population, type of agency, caseload size and nature of service delivery. However, case managers need to be involved in assessment, planning, linking the patient to services and monitoring.

In Australia Cleak (1995) has suggested that there will be a number of opportunities for social workers in response to the changes in health care. Discharge planning, continuity of care (checks on the elderly living alone to assess ongoing health care programs), short-term crisis intervention, services to clinical units, health promotion and social justice issues are all possible avenues for development.

Hospital pharmacy services are likely to change from a department structure to clinical units. Ryan (1996) suggests that the old functional structures:

- inhibited the devolution of managerial authority for the use of resources to clinicians
- have poor communication and coordination across functions
- are slower to respond, are less innovative and make it difficult to pinpoint responsibility for performance
- have a tendency to reinforce territory-preserving behaviour by various professions
- have unclear lines of responsibility for the management of groups of patients, leading to lack of accountability and control
- have a dichotomous situation whereby clinicians are responsible for caring and managers are responsible for control.

A product line model is being adopted in many hospitals in their restructuring:

- this is more suited to a rapidly changing and competitive environment
- better matches accountability and authority with responsibility
- increases interaction and collaboration across professional groups
- increases professionals' capacity for being “closer to the bedside”
- emphasises profitability of “product” or “programs” of the hospital
- emphasises a match between programs and products and the hospital’s strategic direction.
Ryan comments that some of the outcomes of this restructuring have been better communication and decision making as well as increased productivity, responsibility and accountability. It has also led to pharmacies being able to operate within the hospital budget with decreased staffing levels. Although at the time he was writing pharmacy departments largely had remained centralised within hospitals, he predicts this will change.

Under the clinical unit structure managers (of clinical units) will want from pharmacists:

- timely, pro-active advice on the safest, most cost effective drug therapy
- drug distribution systems tailored to the needs of that unit and its patients
- the medication issues of the unit managed in a way that minimises the risk of litigation.

To do this pharmacists will require:

- a responsiveness and focus on their customers
- excellent communication skills
- relevant clinical knowledge
- pharmacoeconomic expertise
- ability to apply technology to their work and that of the unit.
2.4 QUALITY CONTROL

KEY ISSUES RELATED TO THE NEW HEALTH PARADIGM

Culyer and Posnett (1990) point out that, in the US where hospital competition has been most fierce, competition has led to higher costs and excess capacity. Whilst economists embrace the paradigm of

- firms will maximise net worth \( \Rightarrow \) output will be produced at least cost
- \( \Rightarrow \) output will be at the optimal rate in the long run,

this has not translated into the reality of hospital competition.

Culyer and Posnett believe that competition can operate but it will be complicated by hospitals not working from a solely profit making perspective (ie. non-profit mission type hospitals), by there being sufficiently high demand and sufficient alternative suppliers, and by information about performance not being currently available. It is thought that, where health insurers have a monopoly, they will have greater strength to control prices from suppliers. Individuals (patients) who purchase insurance themselves may have little incentive to search for cost-controlled services since they may have tax relief linked to premiums; employer contributions and medical costs are borne by all policy holders and not by the patient who incurs the cost.

QUALITY CIRCLES

Orlikoff and Snow (1984) suggested that “quality circles” could be used in health care settings. A quality circle is a group of employees who work in the same area of an organisation and who meet voluntarily to identify, assess and solve problems in their area of work. The objectives of quality circles are to improve quality, productivity and employee motivation and morale.

Managers may use them to:

- develop an awareness of cost containment in employees
- improve and utilise employee creativity
- develop employees into managers
- help employees grow professionally and personally

Each circle is to identify its own “problem” for solution. This system, although based on problem solving and employee participation, is not the same as quality control measures.
Chapter 2 – Environmental Context

2.5 REFERENCES


Outpatient Costing and Classification Study Incorporating the Developmental Ambulatory Classification System Evaluation (Coopers and Lybrand, Consultants), South Australian Health Commission and Commonwealth Department of Health and Family Services, 1998


Thompson J and Diers D “Nursing Resources” in R Fetter (ed) *DRGs Their Design and Development*, pp 121ff

CHAPTER 3:
INDICATORS FOR INTERVENTION
**THIS CHAPTER IN CONTEXT**

This chapter describes the Indicator For Intervention (IFI) development. It constitutes a major part of the current research project.

In this chapter information is presented on various levels of IFI. It should be noted, however, that only the A and B Level IFIs have been tested and ratified by NAHCC. Considerable additional work is required at the C and D levels within the IFI set.

Diagram 3.1 illustrates the activities that fit within the IFI component of the research.

**DIAGRAM 3.1: CHAPTER THREE IN CONTEXT**

- **CONTENT OF THIS CHAPTER**
  - Background to the development of the Indicator for Intervention statistic
  - Consultation process
  - Research model
  - IFI definition
  - IFI template
  - IFI set
  - Field test data
  - Qualitative
  - Quantitative
  - Applications of the IFI set
  - Recommendations for future research
3.1 BACKGROUND TO IFI DEVELOPMENT

Development of the Indicators for Intervention (IFI) statistic was recommended in the 1997 NAHCC Australian Allied Health Classification System (AAHCS) publication. It was acknowledged that the Allied Health Minimum Data Set, although clearly able to describe various demographics of the client and characteristics of the care provider and the setting, needed and additional descriptor that provided information on the reason why the AHP was providing care to the client.

The IFI set developed as a component of this current project is a client-centred classification of these reasons for intervention.

It sits within the pre-existing AAHCS Minimum Data Set as illustrated below:

**Diagram 3.2: Australian Allied Health Classification System**

The IFI is a statistic that resides within the minimum data set.
WHY NOT USE THE EXISTING ICD CODES AS A BASIS FOR THE IFI?

Some early thinking in the project work-up suggested that the International Statistical Classification of Diseases and Related Health Problems (ICD) codes might be adequate to comprehensively categorise the reason for Allied Health intervention, thus avoiding the requirement for creating a new set of descriptors.

This proved to be unworkable for a number of reasons:

- The high level IFIs (A and B) represent broad characteristics which could not be captured by the highly specific ICD codes.
- The ICD codes are not comprehensively recorded by HIM staff in patient records.
- The ICD codes are mainly procedure and diagnosis based, thus much more likely to reflect actual intervention rather than reason for intervention.
- The ICD codes are largely restricted to acute inpatient settings.

Interestingly, however, the preliminary Level D IFI developmental work suggests that selected ICD codes might be a suitable basis for many of these bottom level IFIs. If so this would create possibilities for bridging to other classification systems.

LOW CAPTURE RATE FOR ALLIED HEALTH - RELATED ICD CODES

The following table is an extract of ICD codes recorded by HIM staff for a series of five patients at a large metropolitan teaching hospital in Victoria. All five patients had extensive involvement from a range of Allied Health professionals, yet only 11 Allied Health – linked ICD codes were captured. Had all relevant codes been captured, this total would be closer to 120. This represents about a ten percent capture rate. Clearly this is unworkable.

Part of the reason for the low capture rate is that many of the Allied Health – related ICD codes do not inform on the discharge diagnosis and are thus assigned low priority for collection. Compounding this is the field space limitation in some data recording software applications.
### Table 3.1: ICD-9 Coding Examples from a Major Teaching Hospital

<table>
<thead>
<tr>
<th>#</th>
<th>Code type</th>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>(Allied Health-related ICD codes in bold italics)</strong></td>
</tr>
<tr>
<td>Patient A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Principal</td>
<td>276.8</td>
<td>Hypocalcaemia</td>
</tr>
<tr>
<td>2</td>
<td>Primary</td>
<td>276.1</td>
<td>Hyposmolality and/or hyponatremia</td>
</tr>
<tr>
<td>3</td>
<td>Primary</td>
<td>E944.49</td>
<td>Other diuretics causing adverse effects</td>
</tr>
<tr>
<td>4</td>
<td>Primary</td>
<td>490</td>
<td>Bronchitis, not specified as acute or chronic</td>
</tr>
<tr>
<td>5</td>
<td>Associated</td>
<td>V15.63</td>
<td>Other personal history presenting health hazard</td>
</tr>
<tr>
<td>6</td>
<td>Associated</td>
<td>401.9</td>
<td>Unspecified essential hypertension</td>
</tr>
<tr>
<td>7</td>
<td>Associated</td>
<td>496</td>
<td>Chronic airway obstruction, neck</td>
</tr>
<tr>
<td>Patient B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Principal</td>
<td>486</td>
<td>Pneumonia, organism unspecified</td>
</tr>
<tr>
<td>2</td>
<td>Primary</td>
<td>511.9</td>
<td>Unspecified pleural effusion</td>
</tr>
<tr>
<td>3</td>
<td>Primary</td>
<td>413.9</td>
<td>Other and unspecified angina pectoris</td>
</tr>
<tr>
<td>4</td>
<td>Associated</td>
<td>250.00</td>
<td>Diabetes mellitus without mention of complication</td>
</tr>
<tr>
<td>5</td>
<td>Associated</td>
<td>401.9</td>
<td>Unspecified essential hypertension</td>
</tr>
<tr>
<td>6</td>
<td>Associated</td>
<td>V45.01</td>
<td>Cardiac device in situ</td>
</tr>
<tr>
<td>7</td>
<td>Associated</td>
<td>332.0</td>
<td>Parkinson's disease</td>
</tr>
<tr>
<td>8</td>
<td>Procedure</td>
<td>XXXX</td>
<td>Principal procedure unrelated to principal diagnosis</td>
</tr>
<tr>
<td>9</td>
<td>Procedure</td>
<td>93.09</td>
<td>Other diagnostic physical therapy procedure</td>
</tr>
<tr>
<td>10</td>
<td>Procedure</td>
<td>93.22</td>
<td>Ambulation and gait training</td>
</tr>
<tr>
<td>Patient C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Principal</td>
<td>599.0</td>
<td>Urinary tract infection, site not specified</td>
</tr>
<tr>
<td>2</td>
<td>Primary</td>
<td>682.6</td>
<td>Cellulitis and abscess of leg, except foot</td>
</tr>
<tr>
<td>3</td>
<td>Primary</td>
<td>789.09</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>4</td>
<td>Associated</td>
<td>784.5</td>
<td>Other speech disturbance</td>
</tr>
<tr>
<td>5</td>
<td>Associated</td>
<td>438</td>
<td>Late effects of cerebrovascular disease</td>
</tr>
<tr>
<td>6</td>
<td>Associated</td>
<td>V43.65</td>
<td>Joint replaced by other means</td>
</tr>
<tr>
<td>7</td>
<td>Procedure</td>
<td>93.22</td>
<td>Ambulation and gait training</td>
</tr>
<tr>
<td>8</td>
<td>Procedure</td>
<td>93.80</td>
<td>Occupational therapy assessment</td>
</tr>
<tr>
<td>Patient D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Principal</td>
<td>410.11</td>
<td>Acute myocardial infarction of other anterior wall</td>
</tr>
<tr>
<td>2</td>
<td>Primary</td>
<td>428.1</td>
<td>Left heart failure</td>
</tr>
<tr>
<td>3</td>
<td>Primary</td>
<td>599.0</td>
<td>Urinary tract infection, site not specified</td>
</tr>
<tr>
<td>4</td>
<td>Complication</td>
<td>413.9</td>
<td>Other and unspecified angina pectoris</td>
</tr>
<tr>
<td>5</td>
<td>Complication</td>
<td>588</td>
<td>Renal failure, unspecified</td>
</tr>
<tr>
<td>6</td>
<td>Complication</td>
<td>486</td>
<td>Pneumonia, organism unspecified</td>
</tr>
<tr>
<td>7</td>
<td>Complication</td>
<td>578.9</td>
<td>Haemorrhage of gastrointestinal tract, unspecified</td>
</tr>
<tr>
<td>8</td>
<td>Primary</td>
<td>275.4</td>
<td>Disorders of calcium metabolism</td>
</tr>
<tr>
<td>9</td>
<td>Primary</td>
<td>712.39</td>
<td>Chondrocaldinosis, cause unspecified</td>
</tr>
<tr>
<td>10</td>
<td>Associated</td>
<td>414.9</td>
<td>Chronic ischaemic heart disease, unspecified</td>
</tr>
<tr>
<td>11</td>
<td>Associated</td>
<td>401.9</td>
<td>Unspecified essential hypertension</td>
</tr>
<tr>
<td>12</td>
<td>Procedure</td>
<td>XXXX</td>
<td>Principal procedure unrelated to principal diagnosis</td>
</tr>
<tr>
<td>13</td>
<td>Procedure</td>
<td>81.91</td>
<td>Arthrocentesis</td>
</tr>
<tr>
<td>14</td>
<td>Procedure</td>
<td>93.09</td>
<td>Other diagnostic physical therapy procedure</td>
</tr>
<tr>
<td>15</td>
<td>Procedure</td>
<td>93.22</td>
<td>Ambulation and gait training</td>
</tr>
<tr>
<td>16</td>
<td>Procedure</td>
<td>94.70</td>
<td>Social work assessment</td>
</tr>
<tr>
<td>17</td>
<td>Procedure</td>
<td>93.09</td>
<td>Other diagnostic physical therapy procedure</td>
</tr>
<tr>
<td>Patient E</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Principal</td>
<td>511.9</td>
<td>Unspecified pleural effusion</td>
</tr>
<tr>
<td>2</td>
<td>Primary</td>
<td>794.8</td>
<td>Nonspecific abnormal results of function study of liver</td>
</tr>
<tr>
<td>3</td>
<td>Primary</td>
<td>286.9</td>
<td>Other and unspecified coagulation defects</td>
</tr>
<tr>
<td>4</td>
<td>Primary</td>
<td>285.9</td>
<td>Anaemia, unspecified</td>
</tr>
<tr>
<td>5</td>
<td>Associated</td>
<td>322.0</td>
<td>Nonpyogenic meningitis</td>
</tr>
<tr>
<td>6</td>
<td>Procedure</td>
<td>XXXX</td>
<td>Principal procedure unrelated to principal diagnosis</td>
</tr>
<tr>
<td>7</td>
<td>Procedure</td>
<td>34.91</td>
<td>Thoracocentesis</td>
</tr>
<tr>
<td>8</td>
<td>Procedure</td>
<td>88.01</td>
<td>Computerised axial tomography of abdomen</td>
</tr>
<tr>
<td>9</td>
<td>Procedure</td>
<td>92.91</td>
<td>Nutritional assessment</td>
</tr>
<tr>
<td>10</td>
<td>Procedure</td>
<td>92.97</td>
<td>Provision of oral nutrition support</td>
</tr>
<tr>
<td>11</td>
<td>Procedure</td>
<td>93.09</td>
<td>Other diagnostic physical therapy procedure</td>
</tr>
</tbody>
</table>
Substantially similar results were found during the retrospective audit carried out at one of the field test hospitals. (This is discussed later in this chapter).

CONSULTATION PROCESS

The IFIs were developed in consultation with each of the NAHCC Allied Health member professions and the state and territory Allied Health Casemix groups. Membership of NAHCC encompasses the professions of:

- Nutrition and Dietetics
- Audiology
- Physiotherapy
- Orthoptics
- Occupational Therapy
- Prosthetics and Orthotics
- Speech Pathology
- Podiatry
- Music Therapy
- Pharmacy
- Social Work
- Clinical Photography and Medical Illustration
- Psychology
- Exercise Science

One of the key challenges in creating a “generic” set of Indicators was the variety of different paradigms within which the Allied Health professions operate. Some professions have a close to the “medical model” of care and exhibit some discomfort when asked to describe the client in terms other than diagnostic and procedural. Others perform largely diagnostic functions for physicians or surgeons and don’t actually “treat” a patient. Others still are deeply involved with the patients psychosocial needs and their work is largely independent of the major medical issue that precipitated the need for care.

For some professions, disease prevention and health promotion are primary goals, whereas others are almost exclusively involved in restoration of impaired health.

The final IFI set which appears in this report was ratified by 21 of the 23 full NAHCC committee members. There were two dissenting views to the IFI set’s adoption: the Australasian Podiatry Council and the New South Wales Allied Health Casemix Committee. Appendix 3 outlines the bases of their concerns.

Diagram 3.3 represents the range of stakeholders involved in the consultation process and the timeframe for its completion.
Chapter 3 – Indicators for Intervention

**Diagram 3.3: Consultation Process for the Research Project**

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Activity</th>
<th>Outcome</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAHCC Exec; NCCCH; CDHAC; SA Health Comm.</td>
<td>IFI Planning Meeting</td>
<td>National Workshop organised; IFI Project funding sought</td>
<td>October 1997</td>
</tr>
<tr>
<td>Full NAHCC; CCCH; CDHAC; SA H’th Comm.; Vic H’th Dept</td>
<td>National Workshop</td>
<td>Agreed IFI Framework; IFI Project funding sought</td>
<td>December 1997</td>
</tr>
<tr>
<td>CDHAC Casemix Branch CDHAC Outcomes Branch</td>
<td>IFI/PI Project Funding Sought</td>
<td>Funding secured from CDHAC; Project team formed; Steering Committee formed</td>
<td>April 1998</td>
</tr>
<tr>
<td>All AH Professional Ass.; Hospital Depts.; Individual clinicians H’th Care Agencies</td>
<td>Stocktake of existing IFI related material</td>
<td>Draft IFI’s collected and evaluated</td>
<td>June 1998</td>
</tr>
<tr>
<td>Project team; Steering Committee; Pilot Workshop; National AH Seminar</td>
<td>Establish IFI Framework</td>
<td>Trialing IFI frameworks: Increased awareness of IFI’s within AH professions</td>
<td>July 1998</td>
</tr>
<tr>
<td>AH Professions; Health Agency representatives from all States &amp; Territories</td>
<td>IFI Model Building Workshops</td>
<td>Validating IFI frameworks Initial work on PI’s; Awareness of performance reporting</td>
<td>August 1998</td>
</tr>
<tr>
<td>Full NAHCC</td>
<td>Model Evaluation</td>
<td>Agreed model for field testing</td>
<td>September 1998</td>
</tr>
<tr>
<td>6 Health Care Agencies in 4 States</td>
<td>IFI Model Field Testing</td>
<td>Set of qualitative &amp; quantitative data describing the adequacy of the model</td>
<td>December 1998</td>
</tr>
<tr>
<td>Full NAHCC</td>
<td>IFI Model Acceptance</td>
<td>Acceptance of IFI/PI Model for circulation in discussion paper</td>
<td>March 1999</td>
</tr>
<tr>
<td>2000 copies distributed to all clinicians; State Health Depts; Health Care Agencies</td>
<td>Discussion Paper</td>
<td>National feedback on perceptions of the IFI/PI Model</td>
<td>May 1999</td>
</tr>
<tr>
<td>Full NAHCC</td>
<td>NAHCC evaluation</td>
<td>Confirm model after evaluation of Discussion Paper FB</td>
<td>June 1999</td>
</tr>
<tr>
<td>Full NAHCC</td>
<td>Final Report</td>
<td>Report to CDHAC</td>
<td>September 1999</td>
</tr>
</tbody>
</table>
3.2 RESEARCH APPROACH

The project team began by undertaking a stocktake of existing “IFI-like” coding systems that it believed may exist at specific sites. The stocktake uncovered numerous sets of allied health diagnosis codes in use at various facilities. These were invariably site specific and a blend of medical diagnostic terms and social demographics. (These codesets are included in Appendix 1).

Concurrently, an IFI definition and a template for the construction of an IFI set were developed at a meeting of the full NAHCC committee.

Much of the discussion around the definition of an IFI related to reluctance by many to move away from activity (or input) descriptors to client / patient characteristics.

IFI DEFINITION

The definition agreed to by the committee is as follows:

An IFI is a service provider description of the characteristics of the individual or population which indicate need for intervention.

An IFI is an overall perspective of a patient from initial assessment to output.

IFI TEMPLATE

The template devised to guide the IFI construction process was felt important as it helped the participants to understand what the project team was attempting to achieve. The template and its logic are presented below:

TABLE 3.2: THE IFI TEMPLATE

<table>
<thead>
<tr>
<th>Focussed on patient / client clinical issue rather than on profession.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The intent of the IFI is to describe the reason why the client is being assessed / treated by the AHP not what treatment the AHP provided.</td>
</tr>
<tr>
<td>The IFI set will cover all service delivery settings.</td>
</tr>
<tr>
<td>The IFI concept is one that spans all care settings. The IFIO reflects the patient / client issue, not where it should be dealt with. Clearly, however, the types of treatments available will differ according to setting.</td>
</tr>
<tr>
<td>A classification structure will exist with a generic “top level” set of IFIs which then drill down to more specific sub IFIs.</td>
</tr>
<tr>
<td>If the IFI set is to be applied to a range of applications, there must be differing levels of specificity in the classification. The “top level” IFIs form the broad basis of “drill down” IFIs.</td>
</tr>
<tr>
<td>The IFIs will be valid and reliable.</td>
</tr>
<tr>
<td>Clearly the IFI set must be validated by practitioners and the field and be consistently coded by all AHPs.</td>
</tr>
<tr>
<td>IFIs will be “linkable” to PIs.</td>
</tr>
<tr>
<td>As the IFI set provides a “patient grouping” facility, it lends itself to the development of outcome measures associated with these groupings. This is the basis of the link between IFIs and PIs.</td>
</tr>
</tbody>
</table>
## Chapter 3 – Indicators for Intervention

### IFIs will be compatible with existing classification systems.

NAHCC is aware that the work of AHPs is best evaluated in the context of the broader health care environment. Systems that are interpretable only within Allied Health are not likely to be useful in examining the unique contributions of AHPs to overall health outcomes. The IFIs at the D level are very similar to (in some cases identical to) ICD 10 codes. This provides for the possibility of mapping across to classifications based on ICD.

### IFI list will cover the majority of cases.

NAHCC recognises that there are undoubtedly some patient issues that are important indicators of the need for AHP services, but occur relatively rarely. These will not necessarily be built into the classification, but could be considered in future versions.

### IFIs will not be Allied Health specific, but IFIs will have meaning to functions of Allied Health.

The concept of the IFI is that it is patient focused rather than profession driven. Thus the set is not specific to Allied Health, but by virtue of its construction process, will be Allied Health sensitive.

### The patient has a unique identifier.

This refers to the presence of an identifying number uniquely allocated to a patient of a particular health care provider. Examples of this are a hospital Unit Record Number and a Community Health Centre Client Identification Code. Without this unique identifier there is no capacity to link the patient to the IFI, minimum data set and the numerous other statistical elements collected for each patient. In its current version the IFI set is thus unable to address population health issues, where local / regional populations may be the targets of AHP intervention. (An example of this is a community stress reduction program offered by a Community Health Centre where the participants are not registered as clients of the Centre).

### ‘At risk’ or present condition is not subdivided.

The characteristic which flags the need for intervention by AHP is usually pre existing in the patient. However there are many situations where AHPs intervene to prevent the emergence of the particular characteristic. NAHCC recognises that the AHP interventions required for at risk and present characteristics may be quite different in nature and complexity, however the IFI set is about the characteristics, not what interventions are carried out.

### IFIs will be mutually exclusive, however a patient may be assigned more than one IFI.

There must be a clear distinction between the various IFIs such that they are mutually exclusive. This is a fundamental tenet of a classification system. This does not suggest, however, that a patient can have only one IFI assigned. Complex patients may have a number of co-existing IFIs.

### IFIs can be a mix of functional, psychological, vocational and social issues.

The IFI concept is such that it is meant to reflect the characteristics of the patient that flag need for AHP intervention. Clearly these characteristics may range from highly functional issues (as may be treated by an Occupational Therapist for example) to purely social characteristics (which are frequently managed by a Social Worker). The presence of multiple “axes” in the IFI set is not problematic in terms of its hierarchy or interpretation.
THE LEVELS (OR HIERARCHY) WITHIN THE IFI SET

Early in the course of the project it was clear that the IFI set needed a “top level” split and at least one further split. The top level split went through several iterations and finally became a split between the patient and his/her environment. This split was designated as the Level A IFI set.

The next split occurs according to broad health and social issues as described in the B Level IFI set.

Each of the B level IFIs then has its own set of C level splits that describe deferring sub-components of their respective B Level issue.

The C Level IFIs then split into the lowest or D level IFIs, which are highly specific “ICD-like” issues.

Only the A and B Level IFIs have been comprehensively subjected to field testing - and subsequently ratified by NAHCC.

The C and D level IFI sets are, as yet, incomplete and will require more work before they can be offered as a workable classification. They are presented in this report to illustrate the general concept of their construction.

Level A: generic grouping of issues into Person or Environment
Level B: broad concepts / issues which drill down from either person or environment
Level C: specific issues which are clustered under a particular B Level concept
Level D: highly specific issues which forms a subset of a particular Level C issue
Chapter 3 – Indicators for Intervention

3.3 THE LEVEL B IFI DEFINITIONS

100 – Psychosocial factors

110 Cognition
Disorders of intellectual/cognitive skills that are acquired or developmental in origin.
NOTE: Excludes issues relating to content of thought or ideation such as cognitive beliefs or delusions.

120 Relationships
Psychosocial disorders that are primarily focussed on interpersonal issues in any context.

130 Behaviour issues
Disorders where the focus is on misconduct, overt behaviours and a-typical responses whether of acquired, developmental or affective origin.
NOTE: difficult to ascribe at times because “behaviour” is common to all disorders, but this is where the behaviour issue is primary.

140 Adjustment
Disorders where the focus is on the individual’s inability to manage life events or changed circumstances.

150 Affect
Disorders where mood and emotional life clearly dominate circumstances.

200 & 300 – Sensorimotor and Biomechanical Functions

210 Head and Trunk control
Motor, neuromuscular, perceptual and sensory functions that enable the functions of head control, sitting and rolling.

220 Upper limb function
Neuromuscular, Musculoskeletal and perceptual functions that enable the functions of upper limb (including reaching, grasping, releasing and manipulation).

230 Lower limb function
Neuromuscular, musculoskeletal and perceptual functions that enable the functions of lower limb (including standing and gait).

240 Urinogenital issues
Issues relating to continence of urine and faeces including muscular and neurological contributions.

250 Swallowing / Feeding
The process that usually involves the movement of food and fluid from the mouth to the stomach via the oesophagus.
Chapter 3 – Indicators for Intervention

260 **Vision issues**
Issues relating to vision impairment and potential for enhancement.

270 **Ocular issues**
Enhancement and pathophysiology of ocular function.

280 **Vestibular Balance**
Issues related to central balance control (vestibular function).

290 **Gastro-intestinal function**
Issues relating to absorption of food and fluids in the gastrointestinal tract and maintenance of normal defaecatory processes.  
*NOTE: Does not include issues relating to malabsorption secondary to GI enzyme deficiency. These are covered under Food Tolerance.*

300 **Neuropathic pain**
Pain which is primarily neuropathic in origin.  
*Note: Pain associated with other dysfunction is NOT included in this IFI.*

310 **Respiratory function**
Issues relating to optimal ventilation and gas exchange and improved exercise capacity.

320 **Cardiovascular function**
Maintaining or enhancing exercise tolerance.

330 **Speech**
Medium of oral communication that employs a linguistic code (language); through the medium one can express thoughts and feelings and understand those of others who employ the same code.

340 **Language**
Medium of communication that employs a linguistic code; through the medium one can express thoughts and feelings and understand those of others who employ the same code. Mediums include written, visual, spoken, auditory.

350 **Voice**
Issues related to the sound produced by the vibration of the vocal folds and modified by the resonators. May include inability to access the larynx or altered structure and function of the larynx. Alternatively the voice may not meet the professional requirements of the user.

360 **Fluency**
Smoothness with which sounds, syllables, words and phrases are joined together during oral language.

370 **Hearing issues**
Issues related to hearing impairment or potential to enhance hearing.
Chapter 3 – Indicators for Intervention

400 – Nutritional factors

410 Biochemical and metabolic issues
Abnormalities of the normal chemical homeostasis of blood and its sub-components, urine or any other body tissue or fluid. This may result from disease, trauma or other body insult.
NOTE: Usual reference ranges for normal chemistry may vary between agencies. “Abnormality” should always be assessed against the treating agency’s own biochemistry reference standards (where they exist).

420 Food tolerance
A food tolerance issue exists where the patient/client has a negative physiological response to a food or one or more of its components. The response may be mediated immunologically, pharmacologically or enzymatically.
NOTE: Food aversion of psychogenic origin is NOT included. It should be coded under Behaviour (B) – Eating – 133 (C)

430 Nutrient adequacy
Health issue associated with an oversupply or under-supply of macronutrients (energy, protein, carbohydrate, fat) or micronutrients (iron, calcium, ascorbate etc)

500 – Social / Occupation and Environment factors

510 Productivity (work/education/home)
Issues or factors influencing the individual’s successful performance or social and occupational roles and functions as relevant to their current/future lifestyle. This includes home care/management, employment/unemployment and education/training related roles and functions.

520 Leisure activities
Play, leisure and avocational activities.

530 Environment
Issues or factors related to the individual’s life environment that can impact upon the individual’s health, functional abilities and well being and/or the individual’s ability to use services to address/promote their health, functional abilities and well being.

540 Self maintenance
Issues or factors influencing the individual’s performance and achievement of adequate self care and maintenance functions as relevant to the individual’s needs and lifestyle.
# 3.4 C and D Level “Drill Down” IFIs

The following table, Table 3.3, lists all B Level IFIs and their “drill-down” C and D Level IFIs.

## 100 – Psychosocial Factors

<table>
<thead>
<tr>
<th>B Level IFI</th>
<th>C Level IFI</th>
<th>D Level IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 Cognition</td>
<td>111 Global</td>
<td>111.1 Confusion / orientation 111.2 ID 111.3 Delirium</td>
</tr>
<tr>
<td></td>
<td>112 Specific skills</td>
<td>112.1 Memory 112.2 Executive 112.3 Visuo-spatial</td>
</tr>
<tr>
<td></td>
<td>113 Academic</td>
<td>113.1 Reading 113.2 Spelling 113.3 Writing</td>
</tr>
<tr>
<td>Note: For language disorders, see 340 Language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 Relationships</td>
<td>121 Interpersonal issues</td>
<td>121.1 Parent – child 121.2 Partner 121.3 Peer / other 121.4 Sibling 121.5 Isolation</td>
</tr>
<tr>
<td></td>
<td>122 Organisation issues</td>
<td>No D level</td>
</tr>
<tr>
<td></td>
<td>123 Abuse</td>
<td>123.1 Child – physical 123.2 Child – sexual 123.3 Child – neglect 123.4 Adult – physical 123.5 Adult – sexual</td>
</tr>
<tr>
<td></td>
<td>124 Sexual issues</td>
<td>124.1 Relationship 124.2 Identity</td>
</tr>
<tr>
<td>130 Behaviour issues</td>
<td>131 Social Conduct (oppositional, elimination, antisocial, attention, tics, impulsivity)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>132 Substance related</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>133 Eating</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>134 Personality (paranoid, obsessive-compulsive, dependent etc)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>135 Sleep</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>136 Thought (psychotic)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>137 Perception (hallucinations)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>138 Illness behaviour (somatoform, factitious)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>140 Adjustment</td>
<td>141 Victim of violence</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>142 Adjustment to health condition</td>
<td>142.1 Acute illness 142.2 Terminal illness 142.3 Chronic illness 142.4 Disability 142.5 Pregnancy 142.6 High Risk Newborn</td>
</tr>
<tr>
<td></td>
<td>143 Adjustment to hospitalisation</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>144 Bereavement / Death</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>145 Phase of Life problem</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>150 Affect</td>
<td>151 Anxiety (panic, phobias, dissociative, PTSD)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>152 Mood (depression, bipolar)</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>Note: Pain to be coded only when of neuropathic origin, see 300 Neuropathic pain</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 200 & 300 – Sensorimotor and Biomechanical Functions

<table>
<thead>
<tr>
<th>B Level IFI</th>
<th>C Level IFI</th>
<th>D Level IFI</th>
</tr>
</thead>
</table>
| **210 Head and Trunk Control** (including sitting, rolling and mobility). | **211 Musculotendinous issue** | **211.1 Weakness**  
**211.2 Tearing**  
**211.3 Stiffness** |
| **212 Joint / Bone issue** | **212.1 Ligament dysfunction**  
**212.2 Joint stiffness**  
**212.3 Joint swelling** |
| **213 Neuromuscular issue** | **213.1 Sensory**  
**213.2 Motor**  
**213.3 Coordination** |
| **214 Skin issue** | **214.1 Scar tissue**  
**214.2 Inflammation**  
**214.3 Infection**  
**214.4 Hypertrophy** |
| **215 Circulatory issue** | **215.1 Vascular Oedema**  
**215.2 Lymphoedema** |
| **220 Upper Limb function** (including reaching, grasping, release and manipulation). | **221 Musculotendinous issue** | **221.1 Weakness**  
**221.2 Tearing**  
**221.3 Stiffness** |
| **222 Joint / Bone issue** | **222.1 Ligament dysfunction**  
**222.2 Joint stiffness**  
**222.3 Joint swelling** |
| **223 Neuromuscular issue** | **223.1 Sensory**  
**223.2 Motor**  
**223.3 Coordination** |
| **224 Skin issue** | **224.1 Scar tissue**  
**224.2 Inflammation**  
**224.3 Infection**  
**224.4 Hypertrophy** |
| **225 Circulatory issue** | **225.1 Vascular oedema**  
**225.2 Lymphoedema** |
| **230 Lower Limb function** (including standing and gait). | **231 Musculotendinous issue** | **231.1 Weakness**  
**231.2 Tearing**  
**231.3 Stiffness** |
| **232 Joint / Bone issue** | **232.1 Ligament dysfunction**  
**232.2 Joint stiffness**  
**232.3 Joint swelling** |
| **233 Neuromuscular issue** | **233.1 Sensory**  
**233.2 Motor**  
**233.3 Coordinative** |
| **234 Skin issue** | **234.1 Scar tissue**  
**234.2 Inflammation**  
**234.3 Infection**  
**234.4 Hypertrophy** |
| **235 Circulatory issue** | **235.1 Vascular oedema**  
**235.2 Lymphoedema** |
| **240 Urinogenital issues (includes continence [urine & faeces] and vaginal tone).** | **241 Bladder control** | No D Level developed  
**242 Bowel control** | No D Level developed  
**243 Vaginal tone** | No D Level developed |
| **250 Swallowing / Feeding** | **251 Dysphagia - acquired** | **251.1 Neurological**  
**251.2 Structural** |
| | **252 Dysphagia - developmental** | **252.1 Neurological**  
**252.2 Structural** |

*Note: Swallowing issues of a behavioural / psychogenic origin are coded under 133 Eating.*
### 200 & 300 – Sensorimotor and Biomechanical Functions

<table>
<thead>
<tr>
<th>B Level IFI</th>
<th>C Level IFI</th>
<th>D Level IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>260 Vision issues</td>
<td>261 Subjective vision disturbance</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>262 Observed vision anomalies</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>263 Vision loss</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>270 Ocular issues</td>
<td>271 Discomfort</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>272 Mobility</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>273 Stereopsis error</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>280 Vestibular Balance</td>
<td>281 Neurological</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>282 Infection</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>290 Gastro-intestinal function</td>
<td>291 Constipation</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>292 Diarrhoea</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>293 Dumping</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>294 Non-functional / obstruction / contraindicated</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>300 Neuropathic pain</td>
<td>No C level developed</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>310 Respiratory function</td>
<td>311 Breathing pattern</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>312 Airways function</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>320 Cardiovascular function</td>
<td>321 Blood pressure disorder</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>322 Activity tolerance</td>
<td>322.1 Enhancing normal tolerance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>322.2 Correcting sub-normal tolerance</td>
</tr>
<tr>
<td>330 Speech</td>
<td>331 Acquired</td>
<td>331.1 Dysarthria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>331.2 Dyspraxia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>331.3 Articulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>331.4 Resonance</td>
</tr>
<tr>
<td></td>
<td>332 Developmental</td>
<td>332.1 Dysarthria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>332.2 Dyspraxia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>332.3 Articulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>332.4 Phonology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>332.5 Professional speech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>332.6 Resonance</td>
</tr>
<tr>
<td>340 Language</td>
<td>341 Acquired</td>
<td>341.1 Dysphasia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>341.2 Cognitive origin</td>
</tr>
<tr>
<td></td>
<td>342 Developmental</td>
<td>342.1 Receptive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>342.2 Expressive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>342.3 Literacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>342.4 Pragmatics</td>
</tr>
<tr>
<td>350 Voice</td>
<td>351 Alaryngeal</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>352 Laryngeal –</td>
<td>352.1 Dysphonia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>352.2 Professional voice</td>
</tr>
<tr>
<td>360 Fluency</td>
<td>361 Acquired</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>362 Developmental</td>
<td>No D Level developed</td>
<td></td>
</tr>
<tr>
<td>370 Hearing issues</td>
<td>371 Conductive</td>
<td>No D Level developed</td>
</tr>
<tr>
<td></td>
<td>372 Sensory</td>
<td>No D Level developed</td>
</tr>
</tbody>
</table>

**Note:** For language comprehension, see 342.1 Receptive.
## 400 – NUTRITIONAL FACTORS

<table>
<thead>
<tr>
<th>B Level IFI</th>
<th>C Level IFI</th>
<th>D Level IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Biochemical and metabolic issues</td>
<td>411 Glucose control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>411.1 Hyperglycaemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>411.2 Hypoglycaemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>411.3 Unstable glycaemia</td>
</tr>
<tr>
<td></td>
<td>412 Electrolyte levels</td>
<td>412.1 Potassium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>412.2 Sodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>412.3 Etc….</td>
</tr>
<tr>
<td></td>
<td>413 Lipid levels</td>
<td>413.1 Cholesterol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>413.2 Triglyceride</td>
</tr>
<tr>
<td></td>
<td>414 Amino acid levels</td>
<td>No D Level developed</td>
</tr>
<tr>
<td>420</td>
<td>Food Tolerance</td>
<td>421 Immunologically mediated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>421.1 True food allergy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>421.2 Food hypersensitivity (IgA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>422 Enzyme deficiency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>422.1 Lactase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>422.2 Sucrase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>423 Pharmacologically induced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>423.1 Vaso-active amines</td>
</tr>
<tr>
<td></td>
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<td>423.2 Methyl xanthenes</td>
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<tr>
<td></td>
<td></td>
<td>423.3 Preservatives</td>
</tr>
<tr>
<td></td>
<td>Note: Food intolerance of psychogenic origin is coded under 133 Eating</td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>Nutrient adequacy</td>
<td>431 Protein – energy adequacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>431.1 Obesity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>431.2 Malnutrition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>431.3 Hypermetabolic states</td>
</tr>
<tr>
<td></td>
<td></td>
<td>432 Vitamin adequacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>432.1 Thiamine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>432.2 Riboflavin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>432.3 Niacin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>432.4 Etc…</td>
</tr>
<tr>
<td></td>
<td>433 Mineral adequacy</td>
<td>433.1 Iron</td>
</tr>
<tr>
<td></td>
<td></td>
<td>433.2 Zinc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>433.3 Calcium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>433.4 Etc…</td>
</tr>
</tbody>
</table>

## 500 – SOCIAL / OCCUPATION AND ENVIRONMENT FACTORS

<table>
<thead>
<tr>
<th>B Level IFI</th>
<th>C Level IFI</th>
<th>D Level IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>510</td>
<td>Productivity</td>
<td>511 Work (employment / unemployment)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>512 Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>513 Home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>514 Play activities (0 – 8 year olds)</td>
</tr>
<tr>
<td>520</td>
<td>Leisure activities</td>
<td>No C Level developed</td>
</tr>
<tr>
<td>530</td>
<td>Environment</td>
<td>531 Transport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>532 Legal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>533 Housing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>534 Finance and material resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>535 Cultural / religious</td>
</tr>
<tr>
<td></td>
<td></td>
<td>536 Food supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>540</td>
<td>Self maintenance</td>
<td>541 Dressing and grooming (including dressing, bathing, showering, toileting and oral hygiene)</td>
</tr>
<tr>
<td></td>
<td>Note: When using these 540 codes, they must be in conjunction with an IFI from the 100 to 300 series.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>542 Feeding and eating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>543 Functional communication (including emergency response, call systems, telephones, writing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>544 Functional mobility (includes mobility associated with self care activities)</td>
</tr>
</tbody>
</table>
3.5 COMMENTS ON THE IFI SET

Clearly the next phase of the IFI research is the development of a comprehensive set of D level IFIs. These are likely to offer greatest flexibility to clinicians in pursuing both outcomes and funding issues.

The 540 Self Maintenance series of IFIs are designed to be used in conjunction with 100 - 300 series IFIs. The Self maintenance codes actually describe the consequence of a dysfunction in one or more of the Psychosocial, biomechanical or sensorimotor IFIs. This presents some inconsistency in coding of IFIs but is highly reflective of the way in which Self maintenance issues are perceived by AHPs (and Occupational Therapists in particular).

D Level IFIs in many cases closely resemble ICD codes. Future phases of the research will examine whether it is possible to assign ICD codes as D Level IFIs. If this is feasible, it will provide a useful bridging capability between IFIs and the DRG classification.

Levels B, C and D will offer different possibilities to the users:

- D will be most useful to clinicians wishing to benchmark aspects of their performance with others within, and external to, their organisation. The IFI provides the common currency across all care provision settings and is independent of the morbidity reporting model in place (eg DRG / AN -SNAP etc)
- C is a useful roll-up of clinically based groupings of patients and provides a good management tool for service heads. It also offers possibilities in service planning, staff appraisal and resource allocation and location.
- B is likely to provide most benefit in service planning and regional or statewide mapping of AHP activity and need.
3.6 QUALITATIVE ANALYSIS OF THE IFI SET

The project team gathered qualitative feedback on the IFI set from a variety of processes. The following diagram illustrates the major data sources.

**Diagram 3.4: Qualitative Data Sources Informing the IFI Model**

- Meetings with Stakeholders
- Focus group meetings at field test sites
- Site feedback sheets
- Responses to the discussion paper
- State/Territory Allied Health Casemix Committee feedback
- Workshops conducted around Australia
- Discipline-specific teleconferences
- NAHCC member meetings and teleconference
- Professional Association feedback
- Individual discussions with Allied Health Professionals

Some of the key activities undertaken to generate these data are listed in Table 3.4:

**Table 3.4: Key Sources of Qualitative Data**

<table>
<thead>
<tr>
<th>Individual discussions with interested stakeholders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Various meetings and communications have occurred between the project team and stakeholders from Commonwealth and State/Territory government levels, peak bodies, professional associations, and of course, NAHCC, since the inception of the project and throughout its life.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The series of workshops conducted around Australia when the IFI set was being developed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>These were held in Sydney, Brisbane, Adelaide, Perth, Hobart, Alice Springs, Ballarat and Albury (from November 1998 to February 1999) to establish a consensus for the development of IFIs. These workshops were also useful opportunities in gathering information on existing IFI sets. After the IFI model was developed, the project team revisited some of the original sites and a range of others, to test it. These forums enabled some fine-tuning to occur and this completed the theoretical development of the model.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Focus group meetings held with the field test site staff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In February/March 1999, one month long intense field testing of the IFI model occurred at the following sites:</td>
</tr>
<tr>
<td>The Alfred Hospital, Victoria</td>
</tr>
<tr>
<td>Austin &amp; Repatriation Medical Centre, Victoria</td>
</tr>
<tr>
<td>East Bentleigh Community Health Centre, Victoria</td>
</tr>
<tr>
<td>John Hunter Hospital, New South Wales</td>
</tr>
<tr>
<td>Royal Children’s Hospital &amp; Mental Health Services for Kids and Youth, Victoria</td>
</tr>
<tr>
<td>Royal Hobart Hospital, Tasmania</td>
</tr>
<tr>
<td>Royal Victorian Eye &amp; Ear Hospital, Victoria</td>
</tr>
<tr>
<td>Toowoomba Health Services, Queensland.</td>
</tr>
</tbody>
</table>
The sites represented acute, ambulatory, rehabilitation, community, paediatric, adult and mental health care settings. During this phase, the project team and site staff liaised regularly. The more formal communications in this process included on site focus groups and teleconferences. Feedback was sought on how clinicians were adapting to the use of IFIs and identification of any gaps in the IFI model.

**Feedback sheets from individual clinicians involved in the field testing.**

Each clinician participating in the field test received a project ‘feedback sheet’ that they could choose to write comments on. These were then sent back to the project team, or in some cases collated by the respective site representative.

**Discipline specific teleconferences.**

Some of the Allied Health professional associations conducted teleconferences with field testing site representatives in their discipline. This was to discuss any issues pertinent to individual professions. Research team members participated in most of these teleconferences.

**Formal responses to the Project Discussion Paper.**

The project team released its *Project Discussion Paper* in May 1999, based on preliminary results of the field testing. This document was circulated to approximately 1,800 individuals and to representatives of all stakeholders. See Diagrams 3.5, 3.6 and 3.7 below for the characteristics of the respondents.

**A series of NAHCC member teleconferences and workshops.**

National “stakeholder workshops” were held to discuss the project in December 1997 and May 1999. These brought together all NAHCC member bodies. Regular teleconferences were held with NAHCC members.

**Feedback from State/Territory Allied Health Casemix Committees.**

Through NAHCC’s membership, the project team was involved in meetings and teleconferences with the State/Territory Allied Health Casemix Committees.

**Feedback from professional associations.**

The project team was involved in meetings and teleconferences with allied health professional associations.

**Individual discussions with AHPs.**

Clinicians from around Australia frequently called the project team to discuss the project.
Chapter 3 – Indicators for Intervention

Characteristics of the Discussion Paper respondents (as referred to on the previous page within Table 3.4, Formal responses to the Project Discussion Paper).

**Diagram 3.5: Survey Respondents’ Profession**

<table>
<thead>
<tr>
<th>Respondents’ Profession</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allied Health</td>
<td>40%</td>
</tr>
<tr>
<td>HIM</td>
<td>30%</td>
</tr>
<tr>
<td>Music</td>
<td>20%</td>
</tr>
<tr>
<td>Orthoptic</td>
<td>10%</td>
</tr>
<tr>
<td>Audiology</td>
<td>10%</td>
</tr>
<tr>
<td>Speech</td>
<td>10%</td>
</tr>
<tr>
<td>Podiatry</td>
<td>10%</td>
</tr>
<tr>
<td>Dietetics</td>
<td>10%</td>
</tr>
<tr>
<td>P &amp; O</td>
<td>10%</td>
</tr>
<tr>
<td>OT</td>
<td>10%</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>10%</td>
</tr>
</tbody>
</table>

The following figure illustrates the proportion of responses to the Discussion Paper by employer category. As might be expected the majority of respondents were from acute hospital settings.

**Diagram 3.6: Respondents’ Organisation Type**

- **Diagram 3.7: Respondents’ State**

From the numerous sources outlined in Table 3.4 on the previous page, the data was collectively analysed for themes in a form of content analysis.
3.7 KEY THEMES EMERGING FROM THE QUALITATIVE ANALYSIS

The following were the major themes arising.

ACCEPTANCE OF THE MODEL

The IFI model was generally well accepted in the environments in which it was exposed. From the early consultations at the national workshops through to the field testing in the various health care settings, AHPs demonstrated a commitment to the concept and the model that ensued.

Both the feedback and the willingness to participate were very positive. The project team had more sites offering to be involved in the field testing than were required. At the end of the testing phase, AHPs reported that the testing ran relatively smoothly and that issues their staff experienced in using the model were usually in relation to a misunderstanding of particular concepts.

In addition, an encouraging response from the Discussion Paper reported that 72.5% of the respondents stated that the IFI set covered the majority of the client/patient health issues in all care provision settings.

MISUNDERSTANDING / MISINTERPRETATION OF THE MODEL

The most common issue that arose amongst AHPs was their understanding, or rather misunderstanding, of the concept of IFIs. Quite often the IFI model was treated as an activity code model, rather than flagging the reason for intervention.

As a consequence, many AHPs asked why the IFI set did not cover issues such as:

- preventative / educational activities
- discharge planning
- assessment
- home visits
- level of intervention

All of these issues relate to activity or intervention.

There were also some difficulties experienced in moving away from the familiar and comfortable concept of diagnosis. This was evident when AHPs asked why the IFI set did not include disease descriptors. There were others who believed they needed the DRG-based diagnosis to determine the IFI(s).

Scepticism and fear were prevalent issues regarding the use of IFI data. Some concern was expressed over the potential use of data for cost cutting purposes. There were queries over the relevance of IFI data for AH (compared with ICD-10 AM and DRG codes) and what it would prove to the government(s).

The level of understanding that AHPs had of the purpose of the IFI set and how it fits into the bigger picture of the Minimum Data Set was sharply greater if they had previously been using an “IFI-like” code set or if they had attended a NAHCC workshop.
This suggests the need for a comprehensive education strategy prior to IFI implementation.

**DESIRE TO APPLY TO RESOURCE PREDICTION ISSUES**

Many AHPs erroneously assumed that the sole intent of the IFI set was to predict resource consumption and develop Allied Health-specific funding models. As an example of this, many AHPs commented that the IFIs did not take account of the patients’ acuity (time intensity) level.

Part of the difficulty in evaluating the acceptance of the model was this common perception that we were attempting to build an Allied Health funding model. There was a low level of understanding of the mechanisms in place for the funding of the different healthcare sectors. Although most AHPs participating in the various workshops had a clear understanding of the application of DRGs to casemix funding, they had little appreciation of the way in which the funding flowed from state/territory governments to the public sector hospitals. Many assumed that if the IFI model was able to accurately predict Allied Health costs, then it would be relatively simple to fund AHP services directly from government to Allied Health departments (effectively bypassing hospital management). This illustrated a need for continuing education with respect to financial aspects of healthcare delivery.

Respondents to the Discussion Paper who felt the IFI could be used as a funding mechanism were asked whether the IFI alone would suffice, or whether additional data elements would be required. Around ten per cent felt the IFI alone would suffice. One quarter believed the IFI plus the activity code would be predictive, whilst almost half felt that other statistics were required.

Diagram 3.8 illustrates these responses:

**DIAGRAM 3.8: SURVEY RESPONDENTS’ PERCEIVED ABILITY OF IFI TO PREDICT RESOURCE CONSUMPTION**

<table>
<thead>
<tr>
<th>Additional data elements for resource prediction</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>no additional data</td>
<td>10%</td>
</tr>
<tr>
<td>ICD codes</td>
<td>15%</td>
</tr>
<tr>
<td>age</td>
<td>5%</td>
</tr>
<tr>
<td>activity codes</td>
<td>20%</td>
</tr>
<tr>
<td>service delivery set</td>
<td>10%</td>
</tr>
<tr>
<td>other</td>
<td>50%</td>
</tr>
</tbody>
</table>

- OTHER
  - Stage of recovery or progress in treatment process
  - Level of disability (e.g., FIM score)
  - Cost of consumables (nutrition supplements, prostheses, appliances, etc.)
  - Discharge destination
  - Level of qualification of the treating AHP
  - Time
A FOCUS ON HEALTH RATHER THAN ILLNESS

Many comments were received on the importance of maintaining a “wellness” approach to the IFI modelling. This was especially prevalent among community health based AHPs who were more likely than their hospital counterparts to be involved in preventative health care.

CONFIDENCE IN THE MODEL

Numerous comments were received regarding the ability of staff to accurately assign the IFI code retrospectively. (See Section 38 which describes the inter-coder reliability for IFI assignation.) This issue flowed over into concern that the IFIs may not prove to be mutually exclusive, however the field test sites indicated that there was minimal ambiguity in coding the relevant IFI(s).

Comments were received that the IFI set was biased towards a particular treatment setting. Interestingly there were approximately equal numbers of claims of paediatric and adult hospital bias.

The research team accepted the view that the IFI set did not well describe population health issues. This was explicitly stated at the beginning of the research project. Population health is an area NAHCC will investigate in a future phase of IFI development.

APPLICATION ACROSS DIFFERENT CARE PROVISION SETTINGS

There was frequent feedback that the IFIs were an improvement on existing systems for classifying patients because they were able to span the various care settings. Interestingly there were approximately equal numbers of comments that the IFI set was either too adult focussed or too paediatrically focussed.

GENERICISATION OF AHPs

The template used to develop IFIs stated that they were not to be AH specific, but instead have meaning to functions of allied health. In light of this, there were some AHPs who reinforced the importance of keeping the IFIs non-discipline specific, but also there were others who expressed concern that the generic nature of the IFIs would lead to a loss of professional identity. Recognition of the diversity between professions in Allied Health is an important strength and AHPs feared that a genericisation would weaken Allied Health’s position in the health sector.

This was further compounded by the concurrent revision of the Australian Allied Health Classification System. A major aim of the revision was to move to provider neutral descriptors of activity or intervention.

Clearly, it is important to have the capacity to identify the nature of the care provider, however this is not a function of either the IFI or the AAHCS activity codes.
CLASSIFYING BEYOND THE IMMEDIATE PATIENT / CLIENT

A number of clinicians from various disciplines commented on the need to address coding issues when a case (or an episode of care) involved the family member(s) or carers of the primary client/patient. The IFI model only allowed for individuals to be coded and the difficulty arose when AHPs saw:

- a family for therapy and therefore the issue was no longer an individual one; or
- a carer who was adjusting to the health condition of the client/patient.

INFORMATION TECHNOLOGY ADEQUACY

While AH is increasingly gaining access to computer hardware and software, it is not a consistent transformation. It was desirable for all test sites to have access to IT in order to participate in the testing phase. This did not happen everywhere and subsequently demonstrated a labour intensive exercise where data was collected manually. It was also apparent that in some sites, one or two AH departments had IT access while their counterparts’ access was negligible. At other sites, clinician access to computer terminals was limited due to too few terminals and thus placed pressure on usage time when entering their data.

Respondents to the Discussion Paper were asked to indicate the extent to which Allied Health activity data were computerised. Almost 80% of respondents indicated partial or complete computerisation of collection.

Diagram 3.9: Extent of Computer-based AH Activity Data Collection – Survey Respondents

EASE OF IMPLEMENTATION

Common issues centred around the ability of the AHP to alter (or request alteration to) the data collection system(s) in place in their organisation. A key determinant of ease of implementation was whether the data collection system was computerised and, more importantly, who managed changes to the system software.
Respondents to the Discussion Paper were asked to indicate how easy it would be to add the IFI statistic to their data collection system.

In those centres using computerised data collection, only 17% of respondents to the Discussion Paper felt the IFI set would be difficult or very difficult to add to their system.

**Diagram 3.10: Estimated Ease of IFI Inclusion in Data Collection Systems**

AHPs raised other issues that would impact upon the ease of collecting IFIs. These were:

- allowing time to collect IFIs;
- manual data collection (where applicable) would mean a more labour intensive process to analyse the data;
- State and Territory data requirements may not leave room for IFIs.
3.8 QUANTITATIVE ANALYSIS OF THE FIELD TEST DATA

FIELD TEST SITES
The primary quantitative elements of the IFI testing process were:

- Relationships between IFI and DRG assignment
- Relationships between IFI and time spent (per patient) by AHPs
- Relationships between DRG assignment and time spent (per patient) by AHPs
- Inter-coder consistency of IFI assignment.

RELATIONSHIP BETWEEN IFI AND DRG
The primary focus of this current research project was the development of the IFI set. However, in the field testing phase, both IFI assignment and DRG assignment were captured in the dataset. This was to enable a preliminary examination of the extent of correlation between the IF set and DRGs.

Since a prime motivation for developing the IFI set was the perceived inability of DRGs to inform adequately on AHP activity, a poor correlation between IFI and DRG would reinforce this perception.

Discharge DRGs were available for some of the inpatient data from some of the field test sites. One of the unexpected frustrations with the field testing exercise was the very long time delay between patient discharge and DRG availability.

<table>
<thead>
<tr>
<th>DRG</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>941</td>
<td>626</td>
<td>35</td>
<td>29</td>
<td>30</td>
<td>0</td>
<td>250</td>
</tr>
<tr>
<td>3</td>
<td>243</td>
<td>33</td>
<td>29</td>
<td>30</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>37</td>
<td>240</td>
<td>29</td>
<td>28</td>
<td>20</td>
<td>0</td>
<td>240</td>
</tr>
<tr>
<td>942</td>
<td>132</td>
<td>38</td>
<td>38</td>
<td>30</td>
<td>0</td>
<td>210</td>
</tr>
<tr>
<td>950</td>
<td>93</td>
<td>36</td>
<td>34</td>
<td>30</td>
<td>0</td>
<td>280</td>
</tr>
<tr>
<td>170</td>
<td>88</td>
<td>32</td>
<td>25</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>291</td>
<td>77</td>
<td>25</td>
<td>22</td>
<td>20</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td>404</td>
<td>66</td>
<td>29</td>
<td>24</td>
<td>30</td>
<td>0</td>
<td>170</td>
</tr>
<tr>
<td>873</td>
<td>59</td>
<td>36</td>
<td>29</td>
<td>30</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td>23</td>
<td>51</td>
<td>28</td>
<td>22</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>Total - all cases</td>
<td>3793</td>
<td>33</td>
<td>29</td>
<td>30</td>
<td>0</td>
<td>320</td>
</tr>
</tbody>
</table>

Mean time by DRG did not exhibit any strong patterns. Time per patient was tightly clustered around 30 minutes. The range of time was from zero minutes to 320 minutes.
TABLE 3.6: ANOVA FOR AH TIME AND DRG

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME and DRG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>308094.200</td>
<td>237</td>
<td>1299.976</td>
<td>1.588</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2910060.769</td>
<td>3555</td>
<td>818.582</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3218154.970</td>
<td>3792</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measures of Association

<table>
<thead>
<tr>
<th></th>
<th>Eta</th>
<th>Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME and DRG</td>
<td>.309</td>
<td>.096</td>
</tr>
</tbody>
</table>

The Eta factor statistic was applied to measure the extent of correlation between DRG assignment and time. This revealed that there was only 1% correlation.

Key point:
From this data it is concluded that DRG assignment cannot predict AHP time expenditure.

TABLE 3.7

TIME RECORDED FOR TOP TEN “FIRST IFIs” IN A SERIES OF 3051 INPATIENTS IN THE FIELD TEST HOSPITALS

<table>
<thead>
<tr>
<th>First IFI</th>
<th>N</th>
<th>Mean Time</th>
<th>Std. Deviation</th>
<th>Median Time</th>
<th>Minimum Time</th>
<th>Maximum Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>510</td>
<td>411</td>
<td>31</td>
<td>43</td>
<td>20</td>
<td>0</td>
<td>250</td>
</tr>
<tr>
<td>311</td>
<td>334</td>
<td>29</td>
<td>17</td>
<td>30</td>
<td>0</td>
<td>80</td>
</tr>
<tr>
<td>232</td>
<td>242</td>
<td>35</td>
<td>29</td>
<td>30</td>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>310</td>
<td>189</td>
<td>35</td>
<td>21</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>621</td>
<td>174</td>
<td>32</td>
<td>19</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>231</td>
<td>161</td>
<td>36</td>
<td>21</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>142</td>
<td>125</td>
<td>44</td>
<td>46</td>
<td>30</td>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>241</td>
<td>103</td>
<td>25</td>
<td>32</td>
<td>10</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>312</td>
<td>89</td>
<td>35</td>
<td>23</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>210</td>
<td>81</td>
<td>35</td>
<td>21</td>
<td>30</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Total (all cases)</td>
<td>3051</td>
<td>33</td>
<td>32</td>
<td>30</td>
<td>0</td>
<td>320</td>
</tr>
</tbody>
</table>

In this table the “first IFI” is noted. In field-test sites the clinicians identified all IFIs that were applicable and then allocated time against each of these. This was in some cases somewhat arbitrary as common tasks (especially assessment) may be undertaken for multiple IFIs.

These are a composite of B and C level IFIs that were current at the time of testing but have since been revised following feedback from both the field test process itself and the Discussion Paper.
Chapter 3 – Indicators for Intervention

### TABLE 3.8: ANOVA FOR AH TIME AND IFI

<table>
<thead>
<tr>
<th>TIME * IFI1</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups (Combined)</td>
<td>166403.114</td>
<td>84</td>
<td>1980.989</td>
<td>1.985</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2959340.838</td>
<td>2966</td>
<td>997.755</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3125743.953</td>
<td>3050</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measures of Association

<table>
<thead>
<tr>
<th>TIME * IFI1</th>
<th>Eta</th>
<th>Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>.231</td>
<td>.053</td>
<td></td>
</tr>
</tbody>
</table>

The correlation between IFI and time was not greater than for the DRG assignment and time. This would be expected from level B IFIs as they are very broad in nature.

The data does suggest that correlation will be somewhat tighter with Level C (and when finalised) Level D, but this needs to be the subject of further research.

Key Point:
IFI at Level B is unlikely to be a useful predictor of AHP time.

### TABLE 3.9

**TIME recorded for top ten “First IFIs” in a series of 1425 outpatients in the field test sites**

<table>
<thead>
<tr>
<th>First IFI</th>
<th>N</th>
<th>Mean Time</th>
<th>Std. Deviation</th>
<th>Median Time</th>
<th>Minimum Time</th>
<th>Maximum Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>632</td>
<td>206</td>
<td>31</td>
<td>18</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>410</td>
<td>144</td>
<td>21</td>
<td>16</td>
<td>30</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>625</td>
<td>110</td>
<td>31</td>
<td>19</td>
<td>30</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>621</td>
<td>82</td>
<td>34</td>
<td>22</td>
<td>30</td>
<td>10</td>
<td>120</td>
</tr>
<tr>
<td>631</td>
<td>76</td>
<td>32</td>
<td>22</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>601</td>
<td>57</td>
<td>29</td>
<td>15</td>
<td>30</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>633</td>
<td>47</td>
<td>37</td>
<td>20</td>
<td>30</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td>603</td>
<td>46</td>
<td>33</td>
<td>17</td>
<td>30</td>
<td>0</td>
<td>70</td>
</tr>
<tr>
<td>600</td>
<td>45</td>
<td>33</td>
<td>19</td>
<td>30</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td>623</td>
<td>39</td>
<td>35</td>
<td>21</td>
<td>30</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>Total (all cases)</td>
<td>1425</td>
<td>30</td>
<td>25</td>
<td>30</td>
<td>0</td>
<td>210</td>
</tr>
</tbody>
</table>

This table represents the mean time for the first IFI coded in outpatient care. The mean time for outpatients is again clustered around 30 minutes, although there are numerous exceptions to this. This may reflect the way in which bookings for outpatient care are structured – it is highly suggestive that 30 minute time blocks are usually allocated for an outpatient episode.
For the overall sample of 1425 cases, the correlation between IFI and time was just over 13%. Clearly this is insufficient as a foundation for funding, but again would be expected to improve dramatically with the application of C and D level IFIs.

Key Point:
The correlation between B Level IFI and time in the outpatient setting is approximately 13%.
3.9 INTER-CODER CONSISTENCY OF IFI ASSIGNMENT

RETIROSPECTIVE AUDIT OF PATIENT RECORDS AT HOSPITAL TEST SITE B

Study Design
All patients seen by (at least) Physiotherapists at Hospital Test Site B for the period March 9 to April 7 1999 were entered into the retrospective IFI coding audit. The managing Allied Health professional assigned the relevant IFI code(s) on a coding sheet on patient discharge. Normal patient record notes were kept.

The researchers (two experienced allied health managers – both with a base qualification in dietetics) later retrieved the patient records and attempted to assign appropriate IFIs according to the available information from allied health entry notes in the record. No additional information was available to the researchers.

The researchers were blind to the AHPs actual IFI assignment and to each other’s assignment.

The aims were:

1. To determine whether the IFI codes could be readily and consistently assigned retrospectively by two independent coders from normal AHP documentation in patient records.

2. To determine the extent to which ICD-10 codes were comprehensively recorded in inpatient histories

Fifty patient records were examined and the following variables noted:
- IFI assignment by Managing Allied Health professional(s)
- IFI assignment by researcher A
- IFI assignment by researcher B
- ICD-10 code string assigned by HIM staff

Table 3.11 summarises the results of the Inter coder reliability component of this activity.
### Table 3.11: Inter-coder Reliability for IFI Assignment

<table>
<thead>
<tr>
<th>case #</th>
<th>Assigned IFI(s)</th>
<th>IFI string identified by: Researcher A</th>
<th>Researcher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>232</td>
<td>312 311 514 232</td>
<td>231 621 232 322</td>
</tr>
<tr>
<td>2</td>
<td>142.2</td>
<td>511 514 621 633 293 311 511 514 142 143</td>
<td>312 311 514 142 431 232 542</td>
</tr>
<tr>
<td>3</td>
<td>0 232 233</td>
<td>631 232</td>
<td>unable to code</td>
</tr>
<tr>
<td>4</td>
<td>312 322.2</td>
<td>413 322 321 232</td>
<td>322 521 312</td>
</tr>
<tr>
<td>5</td>
<td>225</td>
<td>132 293 123</td>
<td>123 132 544</td>
</tr>
<tr>
<td>6</td>
<td>312 232</td>
<td>621</td>
<td>621</td>
</tr>
<tr>
<td>7</td>
<td>212</td>
<td>232 273 514 545 511 144 142</td>
<td>511 514 121 142 545 231 232 271</td>
</tr>
<tr>
<td>8</td>
<td>312</td>
<td>282 116 232 611 511</td>
<td>543 523 322 621</td>
</tr>
<tr>
<td>9</td>
<td>312 212.1</td>
<td>312 541 611 621 431</td>
<td>431 512 511 322 612 232</td>
</tr>
<tr>
<td>10</td>
<td>211 221 231 232</td>
<td>612 512 232 220 511 613 514</td>
<td>322 612 621 511 543 232</td>
</tr>
<tr>
<td>11</td>
<td>232</td>
<td>260 232</td>
<td>232 600</td>
</tr>
<tr>
<td>12</td>
<td>232</td>
<td>232 631</td>
<td>232 621</td>
</tr>
<tr>
<td>13</td>
<td>230 299</td>
<td>631 220</td>
<td>630</td>
</tr>
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<td>232</td>
<td>631 602</td>
<td>623 545</td>
</tr>
<tr>
<td>15</td>
<td>311</td>
<td>281 411 322 311 511 512 232</td>
<td>222 514 621 603 232</td>
</tr>
<tr>
<td>16</td>
<td>230 232</td>
<td>232 621 631 231 511 142 152 322 514</td>
<td>152 511 232 514 621 231 122 602</td>
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<td>17</td>
<td>312 322</td>
<td>322 232</td>
<td>312</td>
</tr>
<tr>
<td>18</td>
<td>232</td>
<td>132 123 152 280 411</td>
<td>132 142 131 422</td>
</tr>
<tr>
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<td>322.1</td>
<td>231 232 312</td>
<td>543 624</td>
</tr>
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<td>20</td>
<td>222 322.2</td>
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<td>322 530</td>
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<tr>
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<td>222.1 322.1</td>
<td>322 431 242</td>
<td>431 242 621 322</td>
</tr>
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<td>22</td>
<td>322.2 221.1</td>
<td>241 514 511 232 311 543 251 252</td>
<td>603 240 271 512</td>
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<td>312</td>
<td>292 322 544 541</td>
<td>541 543 292</td>
</tr>
<tr>
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<td>230 232</td>
<td>321 232</td>
<td>311 514</td>
</tr>
<tr>
<td>26</td>
<td>311</td>
<td>312 511 545</td>
<td>545 515 312</td>
</tr>
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<td>27</td>
<td>232</td>
<td>321 232 612 514 511</td>
<td>514 511 232 621 322</td>
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<td>543</td>
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<tr>
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<td>231 220</td>
<td>511 514 311 322 232 321 621 512 544 152</td>
<td>541 512 231 221 544 211 541 544</td>
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<tr>
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<td>232</td>
<td>261 321 604 232</td>
<td>232 321 231</td>
</tr>
<tr>
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<td>232</td>
<td>632 604 232 511 514</td>
<td>132 511 322 232 514 231</td>
</tr>
<tr>
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<td>201</td>
<td>514 512 232 521 142</td>
<td>514 544 232 210 511</td>
</tr>
<tr>
<td>33</td>
<td>232</td>
<td>232 231</td>
<td>631 232</td>
</tr>
<tr>
<td>34</td>
<td>232</td>
<td>511 116 111 232 514 633 431</td>
<td>431 543 232 633 511 111</td>
</tr>
<tr>
<td>35</td>
<td>322.2</td>
<td>411 261 514 511 232 543</td>
<td>411 431 543 261 232 322 2</td>
</tr>
<tr>
<td>36</td>
<td>221 223 231</td>
<td>113 142 514</td>
<td>431 116 514 543 142 232 311</td>
</tr>
<tr>
<td>37</td>
<td>312 322.2</td>
<td>312</td>
<td>322 232 312 311</td>
</tr>
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<td>38</td>
<td>221.1</td>
<td>312</td>
<td>312</td>
</tr>
<tr>
<td>39</td>
<td>232</td>
<td>322 411 322</td>
<td>411 514 312 232 322 232 631</td>
</tr>
<tr>
<td>40</td>
<td>312</td>
<td>322</td>
<td>293</td>
</tr>
<tr>
<td>41</td>
<td>312 322.2</td>
<td>312</td>
<td>312 311</td>
</tr>
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<td>42</td>
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<td>121 123 534 544</td>
<td>123 137 152 123 232 322 132 544</td>
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<td>282 322 543 544</td>
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<td>312</td>
<td>511 543 545</td>
<td>545 431</td>
</tr>
<tr>
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<td>232 152 311 280 116</td>
<td>312 621 232</td>
</tr>
<tr>
<td>46</td>
<td>322.2</td>
<td>UNABLE TO CODE</td>
<td>UNABLE TO CODE</td>
</tr>
<tr>
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<td>311</td>
<td>312 511 545</td>
<td>545 511 312</td>
</tr>
<tr>
<td>49</td>
<td>311</td>
<td>152 322 232</td>
<td>534 322</td>
</tr>
<tr>
<td>50</td>
<td>232</td>
<td>232 231</td>
<td>232</td>
</tr>
</tbody>
</table>


**CONCLUSIONS**

1. There was little consistency between codes selected by Researchers A and B - except in the area of Nutrition (Researcher A and Researcher B are both experienced dietitians).
2. ICD-10 code strings were not comprehensively documented in patient records.
3. A major impediment to the researchers being able to correctly identify IFIs was the specific jargon and abbreviations used by each profession.

*Recommendation on IFI coding*

The IFIs should be coded by the treating Allied Health professional or by HIM staff who have been specifically skilled up to detect the IFI codes from Allied Health record entries.

### 3.10 APPLICATIONS OF THE IFI SET

Some of the potential applications for the IFI classification are:

- A foundation for AHP - sensitive Performance Indicators;
- A basis for funding of AHP services in a prospective manner in a variety of care delivery settings – once the Level C and DC IFIs are established (much as DRGs have been applied to the funding of acute inpatient services);
- A robust benchmarking tool for AHPs to use within and across healthcare organisations;
- A component of AHP staff development / appraisal systems;
- A means of allocating workloads for AHPs;
- A means of predicting AHP resourcing requirements in local, regional and national populations;
- A “cofactor” which may add more predictive value to DRG weightings;
- A screening / referral tool that may be used by health professionals to determine the need for AHP assessment of the client.

### 3.11 RECOMMENDATIONS

- NAHCC continue to work closely with the Allied Health professions in the development and refinement of the IFI set.

- NAHCC develop an education strategy for AHPs and other stakeholders on the IFI concept. This should be done in conjunction with the National Centre for Classification in Health.

- The Level B IFI set be more extensively tested over a longer period of time to capture long-stay patients.

- Level C and D IFIs be established and tested with clear definitions.