

National Health Information Model

Version 2

The Australian Institute of Health and Welfare is Australia's national health and welfare statistics and information agency. The Institute's mission is to improve the health and well-being of Australians by informing community discussion and decision making through national leadership in developing and providing health and welfare statistics and information.

National Health Information Model

Version 2

This paper is a contribution to the ongoing work in health information modelling and is subject to revision based on future developments in the field of health informatics. The State and Territory health departments are continually enhancing their own enterprise information models and work is currently occurring nationally in Electronic Health Records and HL7 messaging. This and other work in progress will inform the development of future versions of this document.

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Foreword

Australia's National Health Information Model (hereafter referred to as the NHIM) was first published by the Australian Institute of Health and Welfare (the Institute) in November 1995. Version 1 was seen as an important advance in national health information management. This working paper reviews the experience of the Institute in producing and working with a national information model and, based on that experience, presents a new working version of the NHIM.

Australia, like many nations, has been increasingly coming to terms with the need to gain increased value from information and to use contemporary developments in information management. Recent Australian initiatives such as *Health Online* and *HealthConnect* (that contribute to the momentum behind electronic health record development projects, electronic data interchange and business-to-business data exchange) make established information concepts such as the NHIM and the National Health Data Dictionary even more important.

Since the release of Version 1 of the NHIM, considerable feedback has been received on its utility and general presentation. Also during this time, many other information models of particular aspects of the health and community services sectors have been developed. These have tested the logical assumptions in the original Model and challenged the conventions under which it was presented. Although dominant structural considerations remain essentially intact, a number of modifications have been accepted and are presented in this new working version of the NHIM.

Readers of this paper are encouraged to:

- test its applicability in their respective work areas
- contribute to the future development of the NHIM, through feedback on any aspect of content, application or form
- encourage others to evaluate, use and comment on the NHIM.

In May 2002, the National Health Information Management Group and the National Community Services Information Management Group met together for the first time, and agreed to work towards a common information model. This meeting was an important first step in moves towards integration of health and community services information. (The National Community Services Information Model (NCSIM) is described in the National Community Services Data Dictionary (NCSDD) Version 2.)

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Acknowledgments

The construction and publication of Version 1 of Australia's National Health Information Model (NHIM) was a collaborative exercise over 2–3 months. Some 150 or so people attended one or more of 22 formal modelling workshops conducted at various centres and on various topics. The response to the initiative was overwhelming and demand for copies of the publication required two separate reprints.

Moving the NHIM from Version 1 to Version 2 took place under the expert guidance of the National Health Data Committee (NHDC) and the National Health Information Management Group. Proposals for further enhancement of the NHIM and the development of Version 2 were shaped by numerous developments in health information modelling both in Australia and internationally. This working paper details changes that have been made to the structure and presentation of the NHIM. These changes reflect both the collective experience of these developments and original research into information modelling theory undertaken by the information management staff of the Australian Institute of Health and Welfare (the Institute).

The following Institute staff contributed to the development of Version 2 of the NHIM over the past 3 years:

- Mr Nigel Mercer, who was project manager for Version 1 of the Model and who provided expert advice and assistance in preparing this working paper
- Mr Joe Christensen and Ms Bonnie Abraham, who proposed the change from an entity-relationship model to a high-level conceptual model
- Dr Laura Reece and Ms Trish Ryan, who applied the NHIM to a number of specific applications, including development of the National Community Services Information Model Version 1 and a number of subject-specific applications within the Institute;
- Peter White, who provided advice and support
- Mr Graham Horn, who assisted in gathering research material and in preparing this working paper
- Valuable contributions have been received from members of the National Health Data Committee, particularly from Ms Sam Green and Mr Graham Pegler.

Version 2 of the NHIM is the result of a welcome investment of funds by the Australian Health Ministers' Advisory Council and the Institute. The guidance and involvement of Australia's NHDC and the general direction of the National Health Information Management Group were critical to the success of the project.

These contributions and the general support and commitment of the parties to Australia's National Health Information Agreement enabled and sustained what we believe is a most important contribution to health information management in this country.

Executive summary

Since Version 1 was published in 1995, the National Health Information Model (NHIM) has been adopted as the underlying architecture for the National Health Data Dictionary (NHDD) and the Knowledgebase. The Knowledgebase is the electronic registry of national health and welfare metadata standards maintained by the Australian Institute of Health and Welfare (the Institute) on behalf of the National Health Information Management Group (NHIMG) and the National Community Services Information Management Group (NCSIMG).

The development of Version 2 of the Model commencing in 1997 marked a change from the entity-relationship model presented in Version 1 to a high-level, relationship-free, multi-business framework. From 1998 the NHIMG approved the use of the Model version 2, in draft form, as the organising structure for the NHDD and Knowledgebase. This paper is a formalisation of that approval.

This change recognised the NHIM's general acceptance as a high-level framework and the need for multi-layering of the modelling process. That is, it reflects the importance of consistent identification of entities at the national level, and the greater importance of relationships or business rules at lower levels.

The NHIM is an 'information model' – it is independent of process. In other words, it is not concerned with 'how' something happens, but rather with the information structure underlying the diverse processes and policies of healthcare delivery in Australia. By understanding the structure of health information resources, we are better able to exploit the information these resources contain. It is a 'conceptual model' aimed at establishing an agreed high-level structure. It thereby enables broad entities to be identified and described and provides a framework to develop more detailed subordinate models.

In 1998, the NCSIMG adopted a National Community Services Information Model (NCSIM) as the organising framework for the initial edition of the National Community Services Data Dictionary (NCSDD). This Model was based on Version 2 of the NHIM.

As a national framework, the NHIM enables related data elements from the NHDD to be grouped under a single entity rather than organised alphabetically. Entities are the things about which we need to know or hold data on. They may be people, places, objects, events or concepts. The Knowledgebase uses this aspect of the NHIM as the conceptual gateway to locate, identify and download data elements.

The 12 major super-entities of the NHIM can be loosely organised into four categories – Parties and states, State changing events, Environmental factors and Classifying systems. The coverage and importance of particular entities can be assessed by the population of an entity with data elements. For example, if there are few or no data elements for some model entities, this may be helpful in identifying areas for further development or in reassessing the structure of the NHIM. Version 2 of the NHIM contains more entities than Version 1, largely because of the development of several sector-specific contextual models such as the NCSIM, the Disability and Aged Care Model, the Primary and Community Health Services National Information Model, the National Institutional-based Ambulatory Care Model and the Community Health Information Model.

There is increasing interest in the use of the NHIM as the main tool for standardising health and welfare information in Australia. This includes its potential use in developing electronic data, designing information systems and as a framework for the consistent collection, storage and transmission of data. The next 3 to 5 years are expected to prove a watershed for the NHIM, with significant national health information development projects (including

electronic health records) being actively pursued. There are a number of current developments that could see the NHIM applied as an overall model for context-specific models—the HL7 Reference Information Model and the Good Electronic Health Record (GEHR). It could also form the basis of other health information developments, such as *Health Online* and *HealthConnect*, and of the work of the National Electronic Health Records Task Force. The Model will have to continue to prove its worth and utility in these projects, and will need to continue to learn from and develop with them in order to remain at the forefront of this work.

The development of Version 2 represents a significant period of consolidation and maturity for the NHIM. It reflects the Model's progression from an initial concept and design to a more robust architecture. The likelihood is that pressure for its enhancement and development will continue at a more rapid pace in the near future. Greater alignment between the projects under the Health and Community Services Information Management Groups will highlight the need for common information structures. The Model could act as a tool for building consensus, assisting business planning, providing logical frameworks and influencing application development across human service sectors.

Although models can improve information resource use and management in many ways, they are not substitutes for sound data development practice and management. Equally, there is no single best model for health or for any business activity. The best conceptual models continue to be challenged and supported by contextual level models, while accommodating the technical and semantic diversity that generates them.