

Information Model for Patient Safety Incident Reporting Systems

Expert Review Meeting: Summary Report

University of Tokyo, 11-12 September, 2012

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Overview

One of the major challenges of patient safety incident reporting and learning systems lies in the difficulties to extract sound and practical information from the vast amount of data collected. A limitation that hampers the very purpose of reporting systems; that is, to learn from frequent and infrequent mistakes and system failures in order to prevent or mitigate the consequences of such events. The reasons for it are manifold and of complex solutions. Among them is the lack of universal concepts and definitions to name and report patient safety incidents. The Patient Safety Programme of WHO intended to address this challenge with its “Draft Guidelines for Reporting and Learning Systems” published in 2005, and with the “Conceptual Framework for the International Classification for Patient Safety (ICPS)” in 2009.

Further to that work, WHO initiated an innovative research project with support from the Japanese Ministry of Health, Labour and Welfare to advance what it could eventually become a common template for reporting systems. Taking the mentioned Conceptual Framework of the ICPS as a reference, the project sought to identify compatible data elements of incident reports across an international sample of reporting systems. Its output could expectedly be conceived as a core set of common data elements, which could be used to facilitate comparability of reports. It could be seen as a small step towards global learning. The research project used Ontological Analysis and Natural Language Processing to determine the nature and relationships of the data elements present on the reports analysed.

Earlier in the project, WHO organized a one and a half day International Expert Meeting, hosted by the Policy Alternatives Research Institute at the University of Tokyo in Japan, to

introduce the project and discuss challenges and opportunities for directions in the analysis of patient safety incident data. About 15 international experts, including managers of national patient safety incident reporting systems, academics and researchers involved in innovative methodologies for the analysis of patient safety incidents, experts in medical informatics and in health related classifications and terminologies, and WHO staff participated at this meeting (*see attached list of participants*).

The specific objectives of the meeting were to: (1) share experiences and methodologies on the analysis of incident reports; (2) discuss the advantages and challenges for seeking comparability of patient safety reporting systems; and (3) review progress on research project for minimal common template for patient safety incident reporting.

Summary of the meeting and discussions

See attached agenda for details on presenters and topics. Dr Ahmed Zafar of the National University of Malaysia generously chaired the meeting.

1. Drs Ustun and Ghali initiated the technical presentations offering an overview of the WHOFIC framework, highlighting in particular the ICD-11 developments in the area of patient safety and quality. Inspired by the Conceptual Framework of the ICPS, the ICD-11 Quality and Safety Topic Advisory Group (TAG) aimed to facilitate the identification of patient safety incidents and health related outcomes from ICD codes . ICD-11 will thus incorporate important modifications from ICD-10, such as for instance, in Chapters 19 and 20 (injury and external causes). Other conceptual and technical developments such as the dissemination of electronic health records, the SNOMED framework and others, offer potentials for data triangulation between health records and patient safety incident reports.
2. Dr Larizgoitia provided a description of the work of WHO in the area of Reporting and Learning, including the Conceptual Framework of the ICPS. This was complemented by presentations of the experiences of Belgium (Dr van Looy), British Columbia Canada (Dr Taylor), and Denmark (Dr Hansen) in implementing national and subnational reporting systems using the Conceptual Framework as an organizing

framework. Representatives from each country described their experience, highlighted some of the challenges and emphasized the need for customization to meet the particular needs of users in the local context. As showed at the meeting, each institution used some components of the framework, adapted some of its elements, and added new ones to better fit the local goals and needs. The general perception was that reporting systems contributed to foster the culture of patient safety among users and organizations. Some challenges were related to ambiguities of terminologies and definitions, to the risks of misclassification and unreliability, and the need to optimize the use of reporting systems. All presenters claimed the need for more effective mechanisms to extract learning from reporting systems, and agreed on exploring mechanisms to facilitate harmonization.

3. Drs Fujita and Akiyama, Scientists from the Policy Alternatives Research Institute at the University of Tokyo described their experience in applying Natural Language Processing (NLP) and Network Analysis (NA) to patient safety incident reports, as methodologies for data analysis. It was argued, this innovative technology could overcome the risk of misclassification attributed to reporter's partial knowledge and perception bias.
4. Prof Rodrigues and Souvignet described the goals and methodologies of the research project steered by WHO, aiming to provide a first empirically derived, core information model for patient safety incident reports. The project will start by a cross mapping of the Patient Safety Categorical Structure (PSCAST), that is, the computer compatible version of the Conceptual Framework of the ICPS, with data from reporting systems. The mapping will be done in two directions. Top-down (from the Categorical Structure to the formatted data in the reporting system) through ontology mapping, and bottom-up (from the unstructured data to the Categorical Structure) through NLP and NA. The top-down analysis will be replicated to a range of reporting systems. The resulting interaction will define a subset of the Categorical Structure suitable for use in the reporting systems analyzed.
5. Other methodologies aimed to identify patient safety incidents from patient health data were discussed, demonstrating complementary ways to distil relevant

information from existing data sources, such as medical records and incident reports. Dr Farah Magrabi described her work for an automated identification of incident type and risk level, which allows to identify incidents in jurisdictions without a classification, as well as to identify misclassified incidents. Dr Terri Jackson (University of Melbourne) described the use of specific algorithms and definitions of patient safety incidents to identify sub-optimal care using ICD coded data. Algorithms reviewed included the US Medicare Hospital Acquired Conditions (HACs) indicators, the AHRQ Patient Safety Indicators (PSIs), the 3M Suite of Potentially Preventable Event Indicators, the Australian Variable Life Adjusted Displays (VLADs), and the Classification of Hospital Acquired Diagnoses (CHADx).

Main Conclusions

- Learning from the occurrence of mistakes and systems failures that lead to unsafe care is essential for patient safety management and improvement, as well as for international comparisons and global learning.
- Substantial efforts are being undertaken by Member States, patient safety institutions, academia and WHO aiming to elicit useful information from various data sources.
- Learning occurs from multiple entry points. Reinforced mechanisms to facilitate triangulation and synergies across those entry points will optimize the potentials for eliciting knowledge. WHO and partners have an important role to play.
- The Conceptual Framework of the ICPS is a useful guide to organize the knowledge domain of patient safety as well as the development of information systems, including reporting systems, the ICD-11 sections on patient safety and quality, and for research purposes.
- Reporting systems contribute to strengthen the patient safety culture and facilitate patient safety management in healthcare organizations. Whereas, their characteristics, features and related use respond to contextual goals and needs, there is a great potential for improving every systems performance by sharing experiences, successes and solutions

across nations. WHO may play a leading convening role in facilitating the exchange and sharing of experiences in a joint evaluative project.

- A core Information Model for Reporting Systems may facilitate comparability across reporting systems. Initial analysis following the methodologies described will take place with data from Japan, Belgium, British Columbia Canada, and Denmark. Expectedly, this project will further include additional data according to preliminary results.

The meeting concluded with thanks to the Policy Alternative Research Institute of the University of Tokyo for hosting the meeting, and to all participants for their extraordinary contribution and commitment to this important area of work.

WHO wishes to thank all participants for their invaluable contribution to achieve the outcomes of this consultation and to this area of work in general. Names and affiliations are included in the Annex.

Annex 1

List of Participants

TUESDAY, 11TH AND WEDNESDAY, 12TH SEPTEMBER 2012

Venue: Policy Alternatives Research Institute

The University of Tokyo

Dr Ahmed, Zafar

National University of Malaysia
Malaysia

Prof Akiyama, Masanori

Policy Alternatives Research Institute
The University of Tokyo
Japan

Mr Etienne, Mark

GZA Ziekenhuizen
Wilrijk, Antwerp
Belgium

Dr Fujita, Katsuhide

School of Engineering
The University of Tokyo
Japan

Dr Ghali, William

Institute of Public Health
University of Calgary
Canada

Dr Hansen, Joergen

National Agency for Patients Right's
Denmark

Dr Jackson, Terri

University of Melbourne
Australia

Ms Kajiwar, Maki

World Health Organization
Switzerland

Ms Kaneyasu, Futaba

The University of Tokyo
Japan

Dr Larizgoitia, Itziar

World Health Organization
Switzerland

Dr Magrabi, Farah

Australian Institute for Health Innovation
University of New South Wales
Australia

Ms Murakami, Toshie

Policy Alternatives Research Institute
The University of Tokyo
Japan

Dr Nakagami-Yamaguchi, Etsuko

Osaka City University Hospital
Japan

Prof Rodrigues, Jean-Marie

Université Jean Monnet
Saint Etienne
France

Mr Souvignet, Julien

INSERM
Hôpital Nord
France

Dr Taneda, Kenichiro

World Health Organization
Regional Office for the Western Pacific
Philippines

Dr Taylor, Annemarie

BC Patient Safety and Learning System
Children's & Women's Health Centre of BC
Canada

Dr Ustun, Tewfik Bedirhan

World Health Organization
Switzerland

Dr Van-Looy, Luc

GZA Ziekenhuizen
Wilrijk, Antwerp
Belgium

Annex 2. Agenda

Information Model for Patient Safety Incident Reports Expert Review Meeting

Agenda

TUESDAY, 11TH AND WEDNESDAY, 12TH SEPTEMBER 2012

Background and objectives

The systematic analysis of patient safety incident reports, and the subsequent drawing of lessons for local and global learning is one of the major challenges of incident reporting systems. WHO aims to address this challenge and explore mechanisms to facilitate learning and sharing of lessons from patient safety incident reports. To this end, WHO is organizing an expert consultation aiming to: (1) review experiences, highlighting the gaps and solutions, in the analysis and use of national incident reporting systems; (2) explore the needs for a common template for patient safety incident reporting systems to facilitate learning and exchange across institutions and geographical boundaries; (3) review methodologies for achieving such a common template, including the validation of the Conceptual Framework of the International Classification of Patient Safety against Japan Incident Reports through Natural Language Processing; and (4) explore synergies with current developments in ICD. This consultation will expectedly set directions and recommendations for further work in this area. Participants at the meeting are specialists in patient safety incident reporting systems, ICD and classifications, as well as medical informatics, and Natural Language Processing and related methodologies.

Expert review agenda

DAY 1- 11 SEPTEMBER

- 08:30. Introduction and welcoming. *Prof Akiyama, University of Tokyo*
- 08:45. Welcome and objectives of the meeting; *Itziar Larizgoitia, WHO*
- 09:00. WHO Classifications for Health: an overview of ICD-11 and how it can address patient safety information needs. *Bedirhan Ustun, WHO*
- 09:30. Developments on ICD-11 Patient Safety and Quality. *William Ghali, U Calgary, Canada*
- 09:50. Discussion
- 10:15. Break
- 10:45. Experiences in structuring Patient Safety Incident Reports: Successes, challenges and gaps. Moderator and discussant: *Dr Ahmed Zafar, National University of Malaysia.*

- *Dr Luc Van-Looy, and Mr Mark Etienne, GZA Ziekenhuizen, Belgium*
- *Dr Annemarie Taylor, British Columbia Patient Safety and Learning System, Canada*
- *Dr Joergen Hansen, National Agency for Patients Right's. Denmark*
- *Prof Masanori Akiyama, University of Tokyo, Japan*

12:30 Discussion

13:00 Lunch

14:00 An international template for incident reporting systems: Current experiences

14:00 Project overview and the Conceptual framework of Patient Safety. *Itziar Larizgoitia, WHO*

14:15 The Categorial Structure. *Julien Souvignet, INSERM, France*

14:45 Preliminary results from Natural Language Processing on Japan data. *Prof Akiyama and Prof Fujita, University of Tokyo*

15:30 Break

15:50 Future integration of NLP results over the Categorial Structure. *Prof Jean Marie Rodrigues, University St Etienne*

16:10 General discussion

16:45 Wrap up for the day

17:00 Adjourn

DAY 2- 12 SEPTEMBER

08:00. Introduction, summary from Day 1 and objectives for the day

08:20 Using NLP over incident reporting systems. Dr. Farah Magrabi, Sydney, Australia

08:50 Tracking patient safety incident information from medical records and claims. Terri Jackson, U of Alberta, Canada

09:20 General Discussion

10:00 Break

10:30 Next steps in building an Information Model for Patient Safety Incident Reports

11:00 Wrap up and conclusions from the meeting (WHO)

12:00 Meeting Adjourn