Health and Clinical Management - Comparing the Clinical Outcome of Computerized Strategies

Findings from the Section on Health and Clinical Management

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Summary

Objectives: To summarize current excellent research in the field of health and clinical management.

Methods: Synopsis of the articles selected for the IMIA Yearbook 2006.

Results: Current research in the field of health and clinical management analyses impact and patient outcome of both established and recently presented approaches. Usability and effects of extracting data from computerized medical records for preventive care and surveillance issues are a topic as well as strategies for detecting adverse events.

Conclusions: The best paper selection in the field of health and clinical management shows examples of excellent research on assessment, strategies and concepts for computerized health information management approaches. The articles emphasize the necessity of carefully considering health information systems regarding their outcome and compatibility with clinical routine. A concerted management of knowledge about evaluated health information management approaches will advance this trend and should lead to a more evidence-based design of the underlying systems.

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Keywords

Medical Informatics; International Medical Informatics Association; Yearbook; Patient Care Management; Technology Assessment, Biomedical

Introduction

Health and clinical management attends to intra-institutional information systems and management strategies as well as to a cross-border use of health data [1]. The scope of health and clinical management is more and more widened with ubiquitous computing, which emerges as a new application field in healthcare from advances in ICT capabilities and miniaturization of devices [2]. Health information systems can serve as memories [3], support personal and telemedical healthcare management [4], accomplish surveillance issues [5, 6], and can provide a basis for epidemiological studies [7].

Best Paper Selection

The best paper selection of articles for the section 'Health and Clinical Management' of the IMIA Yearbook 2006 presents examples of excellent research focusing on concepts and impact of health and clinical management.

Five excellent articles were selected from international peer reviewed journals in the fields of medicine and medical informatics. The articles cover an area of disease management approaches, clinical decision support, computerized preventive care strategies, and assessment and evaluation approaches. Table 1 presents the selected papers. A brief content summary of the selected best papers can be found in the appendix of this report.

Conclusions and Outlook

The best paper selection for the Yearbook section 'Health and Clinical Management' emphasizes the necessity of carefully considering health information systems regarding their outcome and compatibility with clinical routine [8-10]. To facilitate research and development of those systems, strategies to obtain reliable and unbiased information about the clinical parameters of interest are required [9]. Furthermore, a concerted management of evaluated health information management approaches will advance this trend and may be achieved by systematically organized databases as [11] or surveys like [4], making the impact of adequate technologies comparable. Following this paradigm should result in a more and more evidence-based design of trans-institutional health information systems.

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Table 1 Best paper selection of articles for IMIA Yearbook of Medical Informatics 2006 in the section 'Health and Clinical Management'. The articles are listed in alphabetical order of the first author's surname.

Section Health and Clinical Management
▪ Balas EA, Krishna S, Kretschmer RA, Cheek TR, Lobach DF, Boren SA. Computerized knowledge management in diabetes care. Med Care 2004; 42(6): 610-21.
▪ Dexter PR, Perkins SM, Maharry KS, Jones K, McDonald CJ. Inpatient computer-based standing orders vs physician reminders to increase influenza and pneumococcal vaccination rates: a randomized trial. JAMA 2004; 292(19): 2366-71.
▪ Field TS, Gurwitz JH, Harrold LR, Rothschild JM, Debellis K, Seger AC, et al. Strategies for detecting adverse drug events among older persons in the ambulatory setting. J Am Med Inform Assoc 2004; 11(6): 492-8.
▪ Hsieh TC, Kuperman GJ, Jaggi T, Hojnowski-Diaz P, Fiskio J, Williams DH, et al. Characteristics and consequences of drug allergy alert overrides in a computerized physician order entry system. J Am Med Inform Assoc 2004; 11(6): 482-91.
▪ Toth-Pal E, Nilsson GH, Furhoff AK. Clinical effect of computer generated physician reminders in health screening in primary health care--a controlled clinical trial of preventive services among the elderly. Int J Med Inform 2004; 73(9-10): 695-703.

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2. Bott OJ, Ammenwerth E, Brigl B, Knaup P, Lang E, Pilgram R, et al. The challenge of ubiquitous computing in health care: technology, concepts and solutions. Findings from the IMIA Yearbook of Medical Informatics 2005. Methods Inf Med 2005; 44(3): 473-9.
3. Pluye P, Grad RM. How information retrieval technology may impact on physician practice: an organizational case study in family medicine. J Eval Clin Pract 2004; 10(3): 413-30.
4. Balas EA, Krishna S, Kretschmer RA, Cheek TR, Lobach DF, Boren SA. Computerized knowledge management in diabetes care. Med Care 2004; 42(6): 610-21.
5. Rolnick SJ, Hart G, Barton MB, Herrinton L, Flores SK, Paulsen KJ, et al. Comparing breast cancer case identification using HMO computerized diagnostic data and SEER data. Am J Manag Care 2004; 10(4): 257-62.
6. Mullooly J, Drew L, DeStefano F, Maher J, Bohlke K, Immanuel V, et al. Quality assessments of HMO diagnosis databases used to monitor childhood vaccine safety. Methods Inf Med 2004; 43(2): 163-70.
7. Appelrath HJ, Friebe J, Grawunder M, Wellmann I. The need for open geographical information systems in medicine. Methods Inf Med 2001; 40(2): 69-73.
8. Dexter PR, Perkins SM, Maharry KS, Jones K, McDonald CJ. Inpatient computer-based standing orders vs physician reminders to increase influenza and pneumococcal vaccination rates: a randomized trial. JAMA 2004; 292(19): 2366-71.
9. Field TS, Gurwitz JH, Harrold LR, Rothschild JM, Debellis K, Seger AC, et al. Strategies for detecting adverse drug events among older persons in the ambulatory setting. J Am Med Inform Assoc 2004; 11(6): 492-8.
10. Hsieh TC, Kuperman GJ, Jaggi T, Hojnowski-Diaz P, Fiskio J, Williams DH, et al. Characteristics and consequences of drug allergy alert overrides in a computerized physician order entry system. J Am Med Inform Assoc 2004; 11(6): 482-91.
11. Ammenwerth E, de Keizer N. An inventory of evaluation studies of information technology in health care trends in evaluation research 1982-2002. Methods Inf Med 2005; 44(1): 44-56.
12. Gaus W, Westendorf J, Diebow R, Kieser M. Identification of adverse drug reactions by evaluation of a prescription database, demonstrated for "risk of bleeding". Methods Inf Med 2005;44(5):697-703.
13. Bates DW, Gawande AA. Improving safety with information technology. N Engl J Med 2003; 348(25): 2526-34.
14. Ash JS, Stavri PZ, Kuperman GJ. A Consensus Statement on Considerations for a Successful CPOE Implementation. J Am Med Inf Assoc 2003; 10(3): 229-34.
15. Toth-Pal E, Nilsson GH, Furhoff AK. Clinical effect of computer generated physician reminders in health screening in primary health care—a controlled clinical trial of preventive services among the elderly. Int J Med Inform 2004; 73(9-10): 695-703.

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Appendix: Content Summaries of Selected Best Papers, Section Health and Clinical Management*

Balas EA, Krishna S, Kretschmer RA, Cheek TR, Lobach DF, Boren SA.

Computerized knowledge management in diabetes care.

Med Care 2004;42(6):610-21

A grown interest in evaluated methods and approaches for health and clinical management can be monitored [11]. Underlining this by a review of high-quality publications, the authors of [4] account for a discrepancy in diabetes mellitus care between known evidence-based computerized interventions and their adoption in practice. The study compiles systematically retrieved reports on methods of computer-assisted interventions in diabetes care, which were screened using adequate high quality criteria. Reports have been grouped into 1) computerized prompting of diabetes care, 2) utilization of home glucose records in computer-assisted insulin dose adjustment, and 3) computer-assisted diabetes patient education. One major result of the study is a concise tabular survey of computerized interventions and reported effects. Thus the authors were able to assess a positive impact of a majority of the selected interventions on patient outcomes and guideline compliance.

Dexter PR, Perkins SM, Maharry KS, Jones K, McDonald CJ.

Inpatient computer-based standing orders vs

* The complete papers can be accessed in the Yearbook's full electronic version, provided that permission has been granted by the copyright holder(s)

physician reminders to increase influenza and pneumococcal vaccination rates: a randomized trial.

JAMA 2004;292(19):2366-71

Effects of two different methods of putting computer generated advice for preventive care interventions into practice are reported by [8]. By example of vaccination, the authors studied the actual administration rates in an inpatient setting comparing computer-based standing orders with physician reminders. The first method automatically delivers vaccine orders to specially trained nurses without any physician intervention necessary and produced a significant higher compliance with guidelines than physician reminders. The latter approach presents a reminder alert to a physician and requires explicit order placement, which was followed from vaccine administration in a significant lower number of cases. The authors conclude, that computer-assisted nurse standing orders are an option to increase the guideline compliance and point out, that the positive results concerning vaccination may be generalized to many other preventive screening methods.

Field TS, Gurwitz JH, Harrold LR, Rothschild JM, Debellis K, Seger AC, et al.

Strategies for detecting adverse drug events among older persons in the ambulatory setting.

J Am Med Inform Assoc 2004;11(6):492-8

For developing computer-based algorithms to detect both adverse drug events (ADEs) and medicine-related procedures to prevent them, reliable and unbiased information about their occurrence are needed [9, 12]. The study [9] compares productivity and quality of several strategies for identification of ADEs in a geriatric ambulatory setting. Results show a higher rate of identified ADEs through electronic sources than by traditional strategies, whereas manual provider reports achieved a better positive predictive value. The authors conclude, that the increasing use of electronic medical records offers future potential to improve automated detection of preventable ADEs, but also mention a low number of identified ADEs overlapping across two or more sources. Therefore, the authors suggest a combination of multiple identification strategies for the investigated setting.

Hsieh TC, Kuperman GJ, Jaggi T, Hojnowski-Diaz P, Fiskio J, Williams DH, et al.

Characteristics and consequences of drug allergy alert overrides in a computerized physician order entry system.

J Am Med Inform Assoc 2004;11(6):482-91

CPOE systems offer potential to support physicians in prescription procedures and are proved to increase patient safety [13], but also have to be carefully integrated into workflows [14]. The authors of [10] mention many issues that may lead a physician to override drug allergy alerts and report on a study, which investigates characteristics and consequences of those incidents. All adverse drug events resulting from drug allergy alert overrides in the study setting were assessed to be clinically justifiable and therefore non-preventable. From the results, the authors suggest restricted and improved alerting rules to achieve a more continuous and noninterruptive clinical routine. Analysis of the physicians' common reasons to override drug allergy alerts shows a high complexity of the related medical decision process.

Toth-Pal E, Nilsson GH, Furhoff AK.

Clinical effect of computer generated physician reminders in health screening in primary health care—a controlled clinical trial of preventive services among the elderly.

Int J Med Inform 2004;73(9-10):695-703

Increasing use of computerized medical records with structured data models offers new potentials to support preventive care, which was for instance shown by [8]. The controlled trial [15] reports effects on screening rates and clinical outcome of a physician reminder function, which was fully integrated into an electronic medical record system to support encounter-based opportunistic health screening in a primary healthcare center. Results show a moderate to high increase of laboratory and manual screening tests, whereas significant clinical outcome was proven mainly for cobalamin deficiency. The authors conclude, that the presented system may be valuable for less-established screening areas or when new screening areas are implemented.