

## Bibliography on PDRM Indicators

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August, 2013  
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Indicators based on the definition of preventable drug related morbidity (PDRM) are often called Preventable Drug-Related Morbidity indicators or Medication System Performance Indicators.<sup>a</sup> PDRM indicators are useful, *inter alia*, for estimating the incidence of PDRM and assessing the performance (safety and effectiveness) of medications use in populations, for identifying recurring points of system failure, for directing and monitoring systems corrections (e.g., medications therapy management) , and for identifying patients at risk for PDRM.

The following bibliography lists publications describing the development, testing and application of PDRM indicators in the US, Canada, the UK, Portugal, Spain and Italy. The original development by MacKinnon and Hepler used manual search methods. The published reports and dissertations include valuable data on validation. Faris coded the indicators for computer searching and subsequent applications used computerized searches of clinical or claims data. Sauer refined and replicated the work of Faris and MacKinnon and demonstrated thye application to quality improvement. Most of the European work was stimulated by the work of Cantrill and Morris in the UK. The paper by Avery, et al illustrates the use of PDRM indicators in effectiveness research.

### RESEARCH ARTICLES

MacKinnon NJ, Hepler CD. 2002. Preventable drug-related morbidity in older adults 1. Indicator development. *J Manage Care Pharm* 8(Sep/Oct):365-71.

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<sup>a</sup>A Drug Related Morbidity (DRM) is an unintended adverse patient outcome with a scientifically plausible relationship to either drug therapy or an untreated indication for drug therapy. DRM include significant adverse or toxic effects of drugs, treatment failures, and occasions when a valid indication was not treated. (A DRM includes Adverse Drug Events as defined by Bates at el but also includes treatment failure and non-treatment.)

A DRM is defined as preventable (a PDRM) if it meets the following criteria (Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990;47:533-43):

- (1) The DRM followed a Drug Therapy Problem (DTP) – that is, a recognizable, significant premonitory event or process of care – a sign that therapy is not proceeding correctly
- (2) the DRM was reasonably foreseeable, given the occurrence of the DTP;
- (3) a cause of the DTP and DRM could have been recognized; and
- (4) the cause could have been controlled without foregoing or seriously compromising the therapeutic objective.

The original definitions of DRM and PDRM are found in Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990;47:533-43.

- Morris CJ, Cantrill JA. 2002. Preventable Drug-related Morbidity Indicators in the US and UK. *J Manage Care Pharm* 8(Sept/Oct (5)):372-7.
- Robertson HA, MacKinnon NJ. 2002. Development of a list of consensus-approved clinical indicators of preventable drug-related morbidity in older adults. *Clin Ther* 24(10):1595-613.
- MacKinnon NJ, Hepler CD. 2003. Indicators of preventable drug-related morbidity in older adults 2. Use within a managed care organization. *J Manag Care Pharm* 9(2):134-41.
- Morris CJ, Cantrill JA. 2003. Preventing drug-related morbidity--the development of quality indicators. *J Clin Pharm Ther* 28(4):295-305.
- Flanagan PS, MacKinnon NJ, Bowles SK, Kirkland SA. 2004. Validation of four clinical indicators of preventable drug-related morbidity. *Ann Pharmacother* 38(1):20-4.
- Morris CJ, Rodgers S, Hammersley VS, Avery AJ, Cantrill JA. 2004. Indicators for preventable drug related morbidity: application in primary care. *Qual Saf Health Care* 13(3):181-5.
- Hammersley VS, Morris CJ, Rodgers S, Cantrill JA, Avery AJ. 2006. Applying preventable drug-related morbidity indicators to the electronic patient record in UK primary care: methodological development. *J Clin Pharm Ther* 31(3):223-9.
- Morris CJ, Cantrill JA, Avery AJ, Howard RL. 2006. Preventing drug related morbidity: a process for facilitating changes in practice. *Qual Saf Health Care* 15(2):116-21.
- Guerreiro MP, Cantrill JA, Martins AP. 2007. [Preventable drug-related morbidity: determining valid indicators for primary care in Portugal]. *Acta Med Port* 20(2):107-29.
- Sauer BC, Hepler CD, Cherney B, Williamson J. 2007. Computerized Indicators of Potential Drug-related Emergency Department and Hospital Admissions. *Am J Manag Care* 13:29-35.
- Gianino MM, Foti G, Borghese R, Lorelli S, Siliquini R, Renga G. 2008. Indicators for preventable drug-related morbidity. Practical application in home-based care. *Pharmacoepidemiol Drug Saf* 17(5):501-10.
- Guerreiro M.P., Martins AP, Cantrill JA. 2012. Preventable drug-related morbidity in community pharmacy: development and piloting of a complex intervention. *Int J Clin Pharm* 34(5):699-709.
- Guerreiro MP, Martins AP, Cantrill JA. 2012. Preventable drug-related morbidity in community pharmacy: commentary on the implications for practice and policy of a novel intervention. *Int J Clin Pharm* 34(5):682-5.
- Avery A J, Rodgers S, Cantrill JA, et al. 2012 A pharmacist-led information technology

intervention for medication errors (PINCER): a multicentre, cluster randomised, controlled trial and cost-effectiveness analysis. *Lancet* 2012; 379: 1310–19

Dago Martínez A, Arcos González P, Álvarez de Toledo Saavedra F, et al.. 2013. [Risk indicators of preventable morbidity related to drug utilization.]. *Gac Sanit* [online 21(1):29-36.

Sauer BC, Hepler CD. 2013. Application of system-level root cause analysis for drug quality and safety problems: a case study. *Res Social Adm Pharm* 9(1):49-59.

### ***DISSERTATIONS***

**MacKinnon, NJ 1999** Risk assessment of preventable drug-related morbidity in older persons. University of Florida, ProQuest, UMI Dissertations Publishing,. 9935253

**Faris RJ. 2001.** Explicit definitions to identify preventable drug related morbidity in an elderly population and their use as an indicator of quality in the medication use system [dissertation]. University of Florida. ProQuest, UMI Dissertations Publishing,. 3027513. Available from: *DAI*, 62, no. 10B (2001): p. 4448 ISBN: 0493395156. Note; Some results from this unpublished dissertation are summarized in Hepler & Segal

**Sauer, B.C. 2004** Medication use performance indicator evaluation: A systems perspective. University of Florida, ProQuest, UMI Dissertations Publishing,. 3146251.

### ***BOOK***

Hepler CD, Segal R. Preventing medication errors and improving drug therapy outcomes through system management. Boca Raton, FL: CRC Press; 2003.