A medical chart or medical record review (MRR) is a data collection method used in occupational therapy clinical and research practice. Clinically, a MRR is often utilized for quality assessment and performance analysis, and in research it may be employed to collect retrospective data. However, issues have been raised concerning the feasibility, validity and reliability of a MRR (Luck, Peabody, Dresselhaus, Lee, & Glassman, 2000; Peabody, Luck, Glassman, Dresselhaus, & Lee, 2000; Wu & Ashton, 1997) and there is a lack of literature summarizing best practice for the development, planning and methodology of a MMR (Allison et al., 2000; Eder, Fullerton, Benroth, & Lindsay, 2005). While creating a MRR for a research project concerning work-related traumatic brain injury, the intricacies and complexities of this method of data collection became apparent. Developing guidelines helped to improve the reliability and utility of this project. The purpose of this article is to outline 11 current guidelines for utilizing a MRR as a data collection method.

Guidelines for completing a MRR

1. Define the research question
   All research projects should start with a question to help clarify and focus what information one wants to accrue (Panacek, 1997; Portney & Watkins, 2000; Schwartz & Panacek, 1996). Knowing one’s question helps inform the other components of the MRR. Further in this article the components of the MMR will be explained.

2. Understand the data source
   Not all data sources are optimal for a MRR (Allison et al., 2000; Eder et al., 2005; Schwartz & Panacek, 1996). One needs to know if the information required to answer the research question is (a) available in the record, (b) consistently available in all of the charts, (c) recorded legibly in order to facilitate abstraction, and (d) not contradictory within each chart. Thus it is helpful to know where the information comes from, the methods of gathering the information, as well as the who, when and how this information is documented in the chart.

3. Choose sections or areas of record/data source to review
   Utilized charts may have different sections that describe similar information. However, as literature has identified, contradictory recordings of similar information within each chart may emerge (Banks, 1998; Eder et al., 2005; Krinsley, Gallagher, Weathers, Kutter & Kaloupek, 2003). Thus, to increase the reliability of the MRR it is beneficial to understand where these contradictions can or tend to occur (Schwartz & Panacek, 1996). Furthermore, an educated choice about where each variable is to be abstracted should be made based on knowledge of which section tends to report the information consistently within the data source. All data abstractors should be expected to collect each variable from the same designated section.

4. Create a standardized abstraction form/tool
   A standardized abstraction tool should be developed to help abstractors collect the data from the records (Schwartz & Panacek, 1996). The variables included in the tool should relate to the research questions and objectives. Furthermore, the format of the tool and...
worrying of questions should also be considered. Questions within the standardized abstraction tool should be synonymous with the language and time frame used within the data source. Also the order of the questions within the tool should correspond to the order of information in the chart to facilitate efficient abstraction and decrease abstractor fatigue (Allison et al., 2000; Banks, 1998).

Each chart should be assigned a project identification (ID) number in order to ensure confidentiality and the ID number, not chart or person identifying information, should be indicated on each page of the tool. Also, the ID number should be indicated on the top, right-hand corner for ease of retrieval once the tools are filed. Forms should have an easy to read layout that uses number based variable choices (e.g. 0 = negative; 1 = positive), and the amount of text should be minimized. Circling or checking options aids in ease of abstraction versus having to fill in information. Date and time format should be predetermined (i.e. use of leading zeros, 24 hour versus 12 hour time, number of digits for dates), and when numbers need to be indicated broken lines should indicate the number of digits to be collected including spaces for leading zeros. Options to variables should be inclusive of all possible options, and the investigator should consider whether a “missing/not noted” option is appropriate. As well, simply because a variable is not mentioned in a chart may not necessarily indicate that the variable is missing. For example, a health professional may not report that a patient is not experiencing headaches. However, this may not necessarily indicate that this data is missing, but rather that it was simply not recorded. In these cases, the investigator may need to use the options of “stated negative” and “inferred negative” to be inclusive of all possible responses. Please refer to the article by Nagurney et al. (2005) for further explanation.

5. Develop an abstraction manual and protocol
The investigator also needs to create an abstraction manual to complement the abstraction tool (Allison et al., 2000; Banks, 1998; Schwartz & Panacek, 1996). The manual should outline rules or considerations for abstraction, where to find the information, synonyms that may impact collection, inclusion or exclusionary variable information, guidelines for recording the data, as well as information regarding time frame, dependent questions and negative information.

6. Develop and provide data abstractor training
Data abstractors should have the implicit or specialized knowledge needed for a particular MRR; nonetheless, multiple abstractors will not have exactly the same knowledge base leading to increased inter-abstractor variability (Schwartz & Panacek, 1996; Wu & Ashton, 1997). Also, inter-rater reliability is further decreased if data abstraction and coding is dependent on abstractors making choices or inferences (Wu & Ashton, 1997). If specific implicit knowledge is required of abstractors, abstractors should be chosen based on their education and occupational background. As well, abstractors should be trained in the explicit rules and standards for reviewing the medical charts (Allison et al., 2000; Wu & Ashton, 1997). The content and length of training is dependent on the length and complexity of the MRR.

7. Pilot study the tool
One needs to know if the tool and manual created will work for the data source. The best way to accomplish this is to pilot test the tool and manual before delving into the bigger project (Allison et al., 2000). This will clarify areas for tool and manual improvement.

8. Listen to the opinion of the abstractors
Often the person creating the project is not the one who is collecting the data. In such instances it is the abstractor who becomes the most familiar with the abstraction process. Therefore, it is beneficial to listen to the abstractors’ opinions in order to improve the MRR (Allison et al., 2000). Abstractors can offer valuable information regarding the consistency and legibility of the data source, the compliance of the

“The MRR is often regarded as an easy, inexpensive and quick research method.”
tool with the data source, as well as the usability and feasibility of the created tool and manual.

9. Utilize the advice of others
In order to create the most reliable and useful MRR, one must acknowledge that he or she can not be an expert in all areas and should be willing to accept the advise and guidance of other professionals, clinicians and experts. Projects may need to rely on the knowledge of other professionals such as medical experts, data analysis personnel, software engineers or information technology experts (Allison et al., 2000). These people should be consulted before and throughout a MRR project.

10. Create guidelines for abstraction process
Other guidelines suggested to ensure continued reliability include keeping accurate records; arranging regular research team meetings and engaging in continual abstractor/abstraction monitoring, especially if data abstraction or throughout the entire study - preferably both (Allison et al., 2000; Luck et al., 2000; Schwartz & Panacek, 1996; Yawn & Wollen, 2005). This should include qualitative observations of discrepancies and statistical analysis. Common statistics used are percent agreement, Kappa statistics and inter-class correlations (ICC) (Hunt, 1986). For further information on inter-rater reliability statistical analysis please refer to Hunt (1986) or Portney and Watkins (2000, chapter 26).

The key to a high-quality MRR is planning (Panacek, 1997; Wu & Ashton, 1997). However, MRR is very project specific making a “cookbook approach” to individual projects difficult (Allison et al., 2000, p.116). All details should be well planned before data collection begins because any significant changes require that abstraction begin anew (Schwartz & Panacek, 1996).

As a note, this review of guidelines is not exhaustive and readers are encouraged to review research methods textbooks and other readings before commencing a MRR. Readings the authors found helpful were Allison et al. (2000), Banks (1998), Eder et al. (2005), Gilbert et al., (1996), Hess (2004), Schwartz and Panacek (1996), Worster and Haines (2004) and Wu and Ashton (1997).

The MRR is often regarded as an easy, inexpensive and quick research method (Allison et al., 2000; Schwartz & Panacek, 1996). However, while medical records can represent a convenient and accessible source of data that is not available through other research methods (Allison et al., 2000; Horan & Mallonee, 2003; Worster & Haines, 2004), a MRR can be a complex and difficult process (Gilbert et al., 1996; Wu & Ashton, 1997). Researchers and clinicians involved in a MRR need to appreciate the potential limitations and difficulties in order to address them in the design and preparation. Time and effort need to be invested to create a MRR with high quality validity, reliability, and utility, and the aforementioned guidelines can be used to aid the planning of a MRR. This process, however, can also influence how medical records and forms are designed in order to increase the usability of medical records for prospective and retrospective research purposes.

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Guidelines for completing a MRR

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2. Understand the data source
3. Choose sections of data to review
4. Create an abstraction tool
5. Develop a manual and protocol
6. Develop abstractor training
7. Pilot the tool
8. Listen to abstractor’s feedback
9. Utilize advice
10. Create guidelines for abstraction
11. Perform Statistical Analysis

using multiple abstractors (Allison et al., 2000; Gilbert et al., 1996; Schwartz & Panacek, 1996). Abstraction can be a tedious and tiring process especially if the tool is long or complex. Providing breaks in between consecutive charts can aid in limiting abstraction bias due to fatigue.

11. Perform statistical analysis
Lastly, it is recommended that when using multiple data abstractors inter-rater reliability should be measured either within a pilot study before formal
References


