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# Creating an Open-Source Anesthesia EMR

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# OSAEMR

## Introduction

Currently there are no widely available open-source anesthesia electronic medical records (AEMRs) for independently-practicing CRNAs.

Our goal is to create an open-source, widely-available AEMR that can be downloaded and installed on a tablet computer (the Apple® iPad). For simplicity and ease of use, its focus will be on solo- or small-practice CRNAs operating in environments with limited or no network and computing resources other than the iPad.

*One Patient, One CRNA, and One iPad.*

## Goals and Objectives

### Ease of use

The solution must require minimal learning and setup time, and allow maximum attention to be placed upon the patient and not on data entry.

### Open-source

The solution should be licensed in such a way as to allow users (or developers they employ) to modify and expand the basic code for their own particular uses. However, the license will prohibit commercial use or sale of the solution unless it has been substantially modified.

### Privacy and Security

The solution must comply with USA government security requirements as put forth in the Health Information Portability and Accountability Act (HIPAA) and 21 CFR Part 11 statutes.

### Data Reporting

The solution will allow simplified data reporting to Qualified Clinical Data Repositories (QCDRs) for quality improvement activities and requests by government agencies, such as the Center for Medicare and Medicaid (CMS) Physician Quality Reporting System (PQRS).

### Billing

The solution will allow secure transmission of billing data to third parties.

## Data is Destiny!

*We cannot allow CRNAs to be left behind in the move to AEMRs*

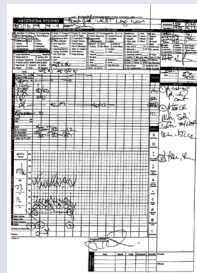
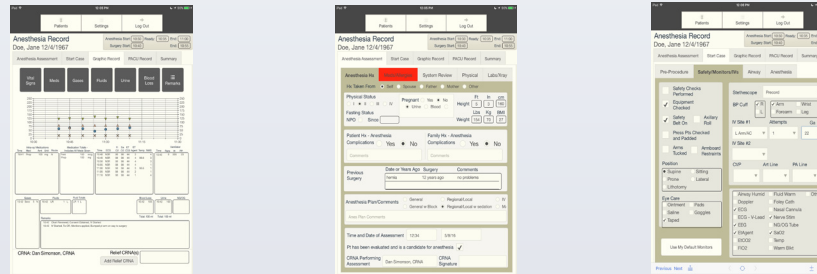
Solo- and Small practice-CRNAs are in danger of being left behind and marginalized as nursing, medicine, and anesthesia move to the digital realm. The tremendous cost and complexity of currently available AEMRs means CRNAs must either rely on paper records or, if they are able to afford it, purchase an AEMR that treats them as if they were working in an anesthesiologist-directed practice by requiring fields such as “attending anesthesiologist” and checkboxes to document anesthesiologist participation – even if there is no anesthesiologist involved in the patient’s care.

Non-medically directed CRNAs will find themselves pushed to the periphery, unable to digitally document their care. Data repositories will come to define this as the “new normal”, and treat independent Nurse Anesthesia practice as an aberration rather than a centuries-old tradition. Similarly, government and private payers demand for “quality data” before payment will leave these nurse anesthetists “out in the cold”.

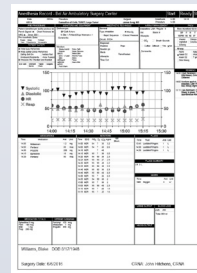
By downloading our free open-source Anesthesia EMR solution CRNAs will be able to create a digital anesthesia record and meet all pertinent requirements for data from third parties inexpensively and in a manner consistent with their independent practice.

Our hope also is that by making our solution source FileMaker files freely available for downloading will mean that any nurse anesthetist may obtain and modify them to suit their purposes and settings. These files may also be shared, allowing for “crowd-sourcing” of quality nurse anesthesia AEMRs!

Screenshots of the AEMR on the iPad



A hand-written version of the AANA Anesthesia Record (left, ca. 1991) next to a printout from OSAEMR.



FileMaker® was chosen as the database application development platform for the following reasons:

Cross-platform: FileMaker applications can be developed on either Windows or Macintosh systems, and be immediately deployed without further modification to iOS devices. With some additional hardware and software (FileMaker WebDirect, available with installation of FileMaker Server), the same solution can also be used on Android® devices via a web browser (Safari, Chrome)

## Methods

Integration: FileMaker easily allows us to import and export data from Excel® and the databases used by the larger EMR firms, such as Oracle, Microsoft SQL, MySQL, and others.

Rapid Application Development: FileMaker, because of its ease of use, allows individual developers like ourselves to create applications with surprising sophistication that take advantage of the many features of iOS devices

- photo, document, barcode, and signature capture
- built-in communication services (phone, internet, text messaging, Bluetooth)
- integration with other cloud services (DropBox, iCloud)

Company stability: FileMaker is a wholly-owned subsidiary of Apple®, with a 25-year history of continuous product improvement. FileMaker 15 was just made available on May 5th of this year.

Scalability: Although our app is designed for individual use, it can be easily scaled by the addition of FileMaker Server on a central fileserver. Using FileMaker Server, a healthcare facility can connect from 1 to 250 iPads, desktops, and laptops to the same version of this solution used on individual iPads.

## References

AANA Board of Directors. (2016). *Documenting Anesthesia Care: Practice Considerations for Policy Development*. Retrieved from <http://www.aana.com/resources2/professionalpractice/Pages/Documenting-Anesthesia-Care.aspx>

Bloomfield, E. L., & Feinglass, N. G. (2008). The anesthesia information management system for electronic documentation: what are we waiting for? *Journal of Anesthesia*, 22(4), 404-411. doi:10.1007/s00540-008-0643-1

Peterfreund, R. A., Driscoll, W. D., Walsh, J. L., Subramanian, A., Anupama, S., Weaver, M., ... Spring, S. F. (2011). Evaluation of a mandatory quality assurance data capture in anesthesia: a secure electronic system to capture quality assurance information linked to an automated anesthesia record. *Anesthesia and Analgesia*, 112(5), 1218-1225.

Peterson, J. J., White, K. W., Westra, B. L., & Monsen, K. A. (2014). Anesthesia information management systems: imperatives for nurse anesthetists. *AANA Journal*, 82(5), 346-351.

Vigoda, M. M., Gencorelli, F., & Lubarsky, D. A. (2006). Changing medical group behaviors: increasing the rate of documentation of quality assurance events using an anesthesia information system. *Anesthesia and Analgesia*, 103(2), 390-395

Weimore, D., Goldberg, A., Gandhi, N., Spivack, J., McCormick, P., & DeMaria, S., Jr. (2015). An embedded checklist in the Anesthesia Information Management System improves pre-anesthetic induction setup: a randomised controlled trial in a simulation setting. *BMJ Qual Saf*.

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