



Annual Report

July 2016 - July 2017



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From the Co-Founders

Sarah D. Draugelis



fEMR was founded on the belief that healthcare for vulnerable populations should be treated the same as healthcare for the wealthy: quality assurances should be in place; oversight should be done with urgency and regularity; peer reviewed works on patient outcomes produced, and so forth. One of the most important steps in these processes is the collection and analysis of patient data, which fEMR makes possible for even remote, high-volume environments. Many healthcare providers who have volunteered abroad share this same view, but most of the people who contribute to fEMR have never even been to these austere locations- a truth which astonishes me now more than ever.

This past year marked the first time fEMR was used in the United States; the development of our Analytics Division; the addition of our Advisory Board; the

advancement of our software; and most importantly, the first time data from fEMR influenced decision-making at an institutional level. Our free and open-source electronic medical records system has allowed teams to, at the least, measure disease in remote areas, and at best, allowed clinicians to see what sort of impact they are having over time. These developments are monumental in the lifetime of fEMR, and are what we have been striving for since just after the 2010 earthquake in Haiti.

So why has so much time, energy, and collaboration been dedicated to fEMR's progress by hundreds of people, most of whom are in fields unrelated to the locations or populations in which fEMR aids medical delivery? The answer is this: We believe in data, we believe in global healthcare, and we believe in equality.

From the Co-Founders

Kevin D. Zurek



When we started developing fEMR there was no easy, free, and fast solution for collecting patient data in places where internet and electricity are not readily available. Today we are processing over 10,000 records, which have been collected using fEMR, for analytics. Analytics that will drive meaningful action and that will improve healthcare for people that live in some of the most remote areas of the world. With the release of our new website and the continued use of fEMR, we are building a platform that will be critical for communication among volunteer medical

teams. This platform is being made possible by the community of people who spend their time helping Team fEMR deliver free and open source software. All design decisions for fEMR are made with the assumption that fEMR will be placed into a clinic with exceptionally high throughput and very limited resources. Everyone at Team fEMR is thrilled to see that this design may also lend itself to disaster relief scenarios inside the United States. We look forward to continuing the development of fEMR and working with so many people who make fEMR the system that we know today.

From the Co-Founders

Erik C. Brown, MD, PhD

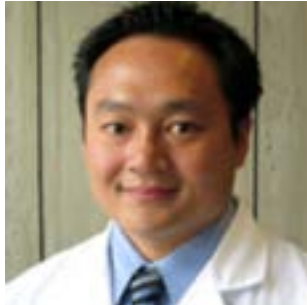


With the experience of traveling with a few different transient medical teams to developing regions, we had this idea to do something to bridge the gap between these teams which are sometimes separated only by time. This was in 2011, after our second time to a remote region of Haiti. We saw that same village, brought many of the same medical personnel, and even saw many of the same patients. However, our memory for prior events and treatments was very poor, and our records nearly non-existent. We realized that such a scenario was not unique to our team at all. Indeed, this was quite the theme across many transient medical teams traveling all over the world. The idea we pursued, evolved into what we call fEMR today. Now, we can go back to the village and quickly look up which treatments were provided and further learn which were effective. This can even be done before the trip, to help plan supply inventories which may maximize effectiveness upon arrival. Further, as we build a network, separate teams which travel to the same region but

originate elsewhere can benefit from each others prior work. And at the end of the chain of communication, the patients who arrive at the makeshift clinic, often having walked for miles on foot or hitched a ride with acquaintances from even farther, receive something that begins to resemble continuity of care. I have been incredibly fortunate to be involved with these patients as well as with the people who have contributed to making fEMR a reality. We all can learn and grow together, and we are. Only 6 years after the idea was born in our heads, I am amazed and honored to watch fEMR becoming a reality, with a purpose and destiny that is beginning to become self-driven. Indeed, I had never expected that fEMR might find use within the borders of the United States of America. I look forward to the further growth of fEMR, seeing where it leads, and making contributions wherever I am able. Working together we can create tools that help us to do those things that enrich the lives of our patients, as well as our own.

Our Team

Board of Directors & Advisory Board



CHAIR

Chih Chuang, MD
Detroit, MI



VICE CHAIR

Andrian Marcus, PhD
Houston, TX



SECRETARY

Philip Sutherland, MD
Chattanooga, TN



TREASURER

Ebere Azumah, MD
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Sudha Jayaraman, MD



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Douglas J. Wiebe, PhD



ADVISORY BOARD MEMBER

William P. Kingsley, CPA



ADVISORY BOARD MEMBER

Andrew Mastie

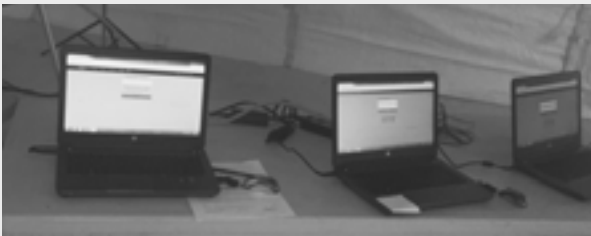


ADVISORY BOARD MEMBER

Justin Hickman, MD

Our Team

Development | Research & Analytics | Administration



Development

[Click here for a complete list of contributors on Github](#)

A.J. Saclayan - Developer
Ciara Diamond- Designer
Ken Dunlap- Lead Developer



Research & Analytics

Adrienne Harris- Medical Coding
Consultant Kaylin Yu- Research Intern
Nicholas Suss – Project Manager for
Development
Pooja Penninti- Data Scientist
Ramya Priya Ogirala- Research
Assistant
Roy T. Sabo, PhD- Statistician
Tamsin Smith- Research Intern



Professional Services

Diane Burek, CPA
Erica Battle, CPA
Nicholas T. Draugelis, Esq.
J. Michael Bernard, Esq.

Development

Our free and open source software is developed by a community of volunteers & students. We partner with universities to include fEMR in the curriculum of Computer Science students.

Current Release:	fEMR 2.3.4
fEMR Code:	github.com/femr/femr
Teamfemr.org Code:	github.com/teamfemr2
Contact:	info@teamfemr.org

Dr. Václav Rajlich, Professor of Computer Science:
Wayne State University, Detroit, MI

Dr. Andrian Marcus, Associate Professor of Computer Science:
University of Texas at Dallas, Richardson, Texas

Dr. Sonia Haiduc, Assistant Professor of Computer Science:
Florida State University, Tallahassee, Florida

Ken Dunlap

- Lead creation of teamfemr.org
- Fixed bug; broken Inventory management
- Simplified Research module for easier exports

Ciara Diamond

- Web designer of teamfemr.org
- Design consultant to Ken Dunlap
- Designer of 2017 Annual Report

AJ Saclayan

- Create non-generic user repository

Brandon Dane

- Moved photo storage from filesystem to database

Jessica Creighton

- Added buttons to navigate between pages
- Addition of Manager role
- Medication inventory exports in CSV format
- Create non-generic patient repository

Judy Baxter

- Sorting the Admin's table of user accounts
- Descriptions added for system configuration

Development

Christopher Richmond

- Alerts for suspected duplicate patients

Martin Van Well

- New optional phone number field
- Search for a patient by phone number

Artem Bolshakov & **Mario Carcamo**

- Proper error message for failed login attempt

Samuel Cabell

- Field validation on Inventory
- Allow user to delete patient problem fields

Drake Svoboda

- Fixed issue with prescriptions not showing up in encounter history
- Prescription quantity will default to NULL instead of 0

Axm155231

- Change name of "Treatment" field to "Procedure/Counseling"

Gerrytucker78

- PDF printout will display amount of medications dispensed

Adrian Kalinowski

- Fix frequency of duplicate patient notifications

Raghunath Thota

- Update age in later encounters

Joel Rizzo II

- Email field will stay populated on bad login attempt

Jarrood Moore

- Age group and age value must match

FSU students

- New user's last name properly displayed
- Fix BMI not being displayed on Medical
- Require Pharmacy disclaimer to be checked
- PDF no longer displays "null" for height

Melissa Heredia

- Manager can view all patients checked in

Deployments



USERS

- Wayne State University:
World Health Student Organization;
Detroit, MI
- Virginia Commonwealth University:
HOMBRE; Richmond, VA
- University of Tennessee: Aid for Haiti;
Chattanooga, TN
- Louisiana State University: Healing
Peru; Baton Rouge, LA
- Serving In God's Name
Syracuse, NY
- Foundation for Peace
New Jersey, USA
- International Samaritan
Ann Arbor, MI
- State of California: Urban Search
& Rescue; DMAT, CA

CLINIC SITES

- Cotundo, Ecuador
- Aqua Blanca, Ecuador
- Guatemala City, Guatemala
- Morne l'Hospital, Haiti
- Port au Prince, Haiti
- Eastern, Haiti
- Bangalore, India
- Tadzana, Nicaragua
- Ciudad de Sandino, Nicaragua
- Cusco, Peru
- Paraiso, The Dominican Republic
- AMES NASA Research Center,
California, USA

Summary

Team fEMRs sixth year of operation came with tremendous growth and activity. Our interest has never been solely on output, but instead, on outcomes. In other words, our goals are not just that medical volunteers utilize our free and open-source electronic medical records system, called fEMR, but that we study data collected so that we may have a deeper, empirical understanding of the impact that short-term medical service trips (MSTs) have. This year was quite remarkable, then, as [end-users from Virginia Commonwealth University demonstrated an improved quality of care in patients with cardiovascular disease after implementing fEMR into their clinics](#). Indeed- these are the paramount achievements that fEMR was designed for.

fEMR was also used for the first time during a disaster training event held at the Ames NASA Research Center in California. Given fEMRs bare-bones nature and that anyone can set up the intranet in under ten minutes, fEMR is ideal for emergency rescue scenarios where communications

may be down, infrastructure unknown, and life-saving medical treatment provided in the field. Participants included West Coast divisions of FEMA's Urban Search and Rescue, the California Medical Assistance Team (CAL-MAT), the California National Guard, and the Department of Veterans Affairs. Those who worked with fEMR were surveyed both before and after the field training exercise (FTX), which simulated a 7.3 magnitude earthquake. There was significant and positive improvement in the rankings for communication within the team; the overall quality of the health care that you give your patients; time required to enter orders; and timeliness of results and reporting. Team fEMR is now working with members of CAL-MAT to publish a peer-reviewed article about the integration of fEMR into the FTX, and will be designing an iteration of fEMR to support emergency disaster relief. [Read the full report here](#).

The year culminated with the launch of an interactive map displaying information about medical schools who participate in international medical relief

Summary

efforts, including details like locations visited, months of travel, trip participants and sources of funding. This database of program information will eventually be tied to our repository of de-identified patient data, facilitating collaboration and research. It is with great enthusiasm that we also welcome the addition of an Advisory Board, comprised of experts in epidemiology, global health, information technology, business management, and accounting. [Read more about our Advisory Board here.](#)

With our growing team and our expanding responsibilities, next year will be focused largely on enhancing

the analytic capabilities of fEMR so that we may continue to provide insight into these unique modes of healthcare delivery. The need for data collection and analysis is best illustrated by a recent literature review on MSTs which revealed that almost 95% of publications lacked any significant data collection, and that most articles failed to include even basic demographic descriptions of patient populations.¹ We are honored and excited to continue to solve this need for data, to work for those who lack access to basic healthcare, and to facilitate professional partnerships in transient medical relief worldwide.



Financials

Thank you to the generous donors and sponsors who have helped to make this year so successful. As in the past, private donations have allowed us to keep up with the increased demand for fEMR, and to help cover overhead costs. Amazon Web Services makes our cloud hosting possible and JetBrains has been wonderful through their constant support of open source software. Though Team fEMR continues to be a volunteer-driven organization, independent contractors were recently hired for the first time under a grant from the Roddenberry Foundation. This was an exciting and necessary step, and Team fEMR will continue to seek sufficient funding to hire a full-time staff for fiscal year 2018. Tax-deductible donations can be made at teamfemr.org.

[Click here to view Fiscal Year 2016
Financial Report & 990N](#)



roddenberryfoundation.org



aws.amazon.com



jetbrains.com

Vision

“... a commitment to data collection, analysis and dissemination is critical to ensuring an organization’s long-term success, and to the iterative development of a sustainable approach to strengthening health systems in the world’s most limited and complex environments”²

*– Jeffrey D. Freeman & Cassidy Rist,
“Data-Driven Done Right” (Global Health Now)*

Much has been said both in support of and strongly opposed to the existence of MST’s- generally defined as a group of clinicians from a high-income country providing free care for a short amount of time in a low-income country¹. Such teams are criticized for having no oversight¹; for being ineffective or even harmful to the patients; for not providing follow-up care³; for reinforcing the well-fare system; and for providing culturally inappropriate treatment⁴. However, they have the potential to augment healthcare systems by providing more frequent care to remote populations⁵; they can provide local clinicians with data about diseases in hard-to-reach areas; volunteers often work in regions where there is limited

access to healthcare because of corruption, natural disasters, or war; they have, in at least one setting, promoted gender empowerment⁶; and, arguably the most important of all, they create hope, humility, and compassion⁷.

Regardless of the subjective opinions shared about MST’s, there remains very little empirical evidence about them, and yet they still occur with growing frequency¹. Conservative estimates show that \$250 million dollars are spent annually on these these types of trips⁸ and that 27% of American medical students will participate in global health experiences by the time they graduate⁹. Allowing this mode of health-care delivery to continue to go under-researched and unregulated would

Vision

be doing a disservice to hundreds of thousands of patients, to the host-countries, and to the fields of global health and epidemiology.

Team fEMR has provided both a way to collect data and a platform for collaboration, but there are many questions that remain for the year ahead: What is the most ethical home for the data collected by fEMR? How can we implement data-driven standards in mobile clinics? How can we enforce accountability, and ensure that professionals in host-countries are not being excluded from any dialogue or research? And, for the domestic use of fEMR by emergency responders: How can we interface fEMR with our federal patient tracking system during a disaster? How can we guarantee a timely setup of fEMR's intranet signal even when the status of infrastructure and communications will be completely unknown until responders reach the scene? Please join our community as we continue to navigate through this complex and important domain.



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