American Clinical MEG Society

ACMEGS *News Letter*

Content

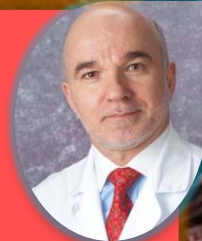## MEG Teams of Texas (TexMEGs) and Medicaid Texas

My name is **Gretchen Von Allmen**, and I am the director of the Pediatric Epilepsy Program at the University of Texas Health Sciences Center in Houston (UTH). I have been a member of the ACMEGS board since 2013. Magnetoencephalography (MEG) is an important part of my clinical practice at UTH, and I have used it as a key component of presurgical evaluation for focal intractable epilepsy in children since 2007. *(cont. on page 7)*

President's Desk

Dear Colleagues and Members,

I am pleased to greet you in this new issue of the ACMEGS Newsletter.

As many of you witnessed first hand, we had a very successful 2014 Course and Annual Meeting in Atlanta GA, thanks in part to **John Ebersole,** course director, and **Michael Funke**, meeting chairman. The record attendance of both events is testimony to the success of our efforts to promote clinical MEG among both our members and new enthusiasts. It was great to *(cont. on page 2)*

Featured Topic
In Search Of Sense In Reimbursement Practices
Michael Longacre & Michael Funke

One means by which the Centers of Medicare & Medicaid Services (CMS) use to determine the appropriate payment for a technology is the information the provider forwards in the annual cost report. Medicare-certified institutional providers are required to submit an annual cost report to a Medicare Administrative Contractor (MAC). The cost report contains provider information such as facility characteristics, utilization data, cost and charges by cost center for Medicare patients only. The hospital's charge information is contained on its chargemaster. Although U.S. hospitals account for the single largest chunk of the nation's $2.7 trillion in health spending, few of them can say how much it actually costs them to care for every patient they admit. *(cont. on page 3)*

President's Desk
(cont. from front page)

see quite few fresh faces yearning to learn more about MEG from our various speakers. Your response makes us believe that the future of clinical MEG looks bright. You can read the reflections of Dr. Ebersole regarding the 2014 Course on page 9, and those of Dr. Funke concerning the Annual Meeting on page 10. In this newsletter, we start a new practice of printing abstracts of the meeting presentations (pages 11 - 14).

Although probably not at the front of your thoughts, as you juggle your daily clinical routine, the struggle for a fair MEG reimbursement is far from over. This remains one of the principal efforts of the Board with the help our consultant, **Michael Longacre**. He and our past president, Michael Funke, aka *"the pioneer of MEG reimbursement"*, provide our Featured Topic on pages (1, 3 - 4). Surely, their article will increase our reimbursement literacy and enable all of us to navigate the maze of health care regulations more effectively. Not only do I encourage everyone to read it meticulously, but also please send our experts any specific questions that you may have. In support of the featured topic, by his personal permission, we are reproducing a related article (advisory.com/costvscharges) of Mr. **Michael Koppenheffer** (*The Advisory Board Company*) on pages 5 and 6.

Having convinced all significant commercial payers to issue positive MEG coverage policies, Medicaid remains the only relevant player needing our specific attention. The problem is more complicated because each state Medicaid has a different modus operandi, and none has a positive coverage policy. Despite our attempts over several years to engage in productive conversations with local Medicaid Medical Directors, no major progress has been made in obtaining an opportunity for a real dialogue. Building on our experience with commercial payers, where initial precedent-setting was key, we have decided to attempt the same with Medicaid. Our enthusiastic colleagues from three Texas MEG sites teamed up and approached Medicaid of Texas collectively to appeal for an affirmative Medicaid coverage policy for MEG, that hopefully could be replicated throughout the rest of the U.S. Our Board member, **Gretchen Von Allmen**, shares her personal perspective on this very important effort on pages 1, 7 - 8.

Additionally, **Susan Bowyer**, Chair of our PR Committee, provides a summary of various 2014 PR activities on pages 17 - 18. 2015 Course and Annual Meeting programs can be found on pages 17 and 18, respectively. We close this issue with announcements of the upcoming conferences of interest to our membership.

I hope that you will enjoy our newsletter and find it both informative and practically useful. We encourage you to propose topics for the next newsletter to make it bigger and better. Please, step up and join us.

Truly yours,
Anto Bagić, MD, PhD
President, ACMEGS

Featured Topic: *Reimbursement Practices* (*cont. from front page*)

Retail Prices Often Bear Little Connection To Costs

To be sure, most hospitals have long lists of prices they charge for every service, from aspirin to MRI scans, and those end up on bills given to insurers and patients. However, most hospital charges have little or no connection to what supply, service or episode of patient care actually costs the facility. For decades, hospitals had set those prices using an opaque process that relied on abstruse formulas to account for factors such as unpaid bills and inflation. The list prices that resulted were more akin to a car's sticker price, used as a starting point for negotiations with insurers, who generally win substantial discounts.

[*Source*: **Many hospitals struggle to understand their own cost data** by Julie Appleby, Kaiser Health News, June 30, 2014].

Let's take a look at the information supplied to CMS concerning the costs associated with MEG. It is this information that CMS utilized to deter- mine an appropriate reimbursement for MEG in 2015. The charts below contain the cost data submitted to the MACs for the charges and costs associated with MEG in 2014 and 2015. Please remember that the hospital cost report, at best, combines the MEG and the EEG on the cost report. Unfortunately, CMS believes that the MEG costs are comparable to EEG. cost.

Costs for Hospital Outpatient Services, by Healthcare Common Procedure Coding System (HCPCS) code for CY 2014

HCPCS	SI	APC	Payment Rate	Single frequency	Total frequency	Minimum Cost	Maximum Cost	Median Cost	Geo Mean Cost
95965	S	0065	$1,740.86	43	88	$500.51	$11,602.83	$1,675.51	$1,802.13
95966	S	0065	$1,740.86	10	49	$198.01	$7,249.64	$1,650.53	$1,738.13

Costs for Hospital Outpatient Services, by HCPCS code for CY 2015

HCPCS	SI	APC	Payment Rate	Single frequency	Total frequency	Minimum Cost	Maximum Cost	Median Cost	Geo Mean Cost
95965	S	0065	$1,421.22	64	96	$381.11	$6,778.88	$1,388.23	$1,590.14
95966	S	0065	$1,421.22	15	43	$90.74	$6,039.04	$1,164.11	$1,121.07

Please note the low numbers of total claims and the large differentials between the minimum and maximum cost. Medicare calculates cost numbers by multiplying a MEG center's charge data with the general **cost-to-charge ratio (CCR)** of the hospital, or if available, its EEG service line CCR. Such CCR factors could range from 0.1 to 0.5, hence reported MEG charges might be 5 to 10 fold higher than the shown cost data. The cost data presented in the table are believed by CMS to reflect the true cost of MEG services per patient from the submitting hospital. However, there are a multitude of factors other than helium cost and a MEG service contract determining the cost of MEG, and, as stated above, some hospitals are likely not to know their actual MEG costs. ()

Featured Topic (*cont. from page 3*)

Nevertheless, the difference between minimum and maximum cost is a common occurrence, especially with technologies that are high cost. If cost data were reported in error, an individual error is often minimized by a high frequency of use. In the case of MEG, our total use frequency is very low at 88 (2012) and 96 (2013) for CPT/HCPCS 95965. Furthermore. only a very few hospitals operate MEGs and submit charges to CMS. Hence, any reported charge that is in error has a significant impact on the resulting geometric mean. It is the calculated geometric mean that CMS uses to establish the reimbursement for MEG.

As a matter of fact, erroneous data reported to CMS also have the potential to impact Medicaid reimbursement. A report published by the Kaiser Health Foundation found that *Medicaid fees for primary care services averaged 59% of Medicare fees for the same services, and the Medicaid-to-Medicare fee ratio for services overall was 66%.53 (*Medicaid: A Primer 2013).

ACMEGS strongly urges each MEG facility to determine if the reported costs and charges for MEG are accurate. No doubt, each institution will have a unique office or individual who manages the chargemaster and corresponding costs. This may take some significant effort on your part, but hopefully it will be well worth the effort, especially if your reported costs/charges are in error.

Note: an additional means of gaining this information is through the Freedom of Information Act (FOIA). Individual cost reports may be requested from Medicare Administrative Contractors via this act. An inquiry through FOIA should enable you to access the costs reported to MAC from your facility. Here is the url with additional information on submitting a FOIA request (http://www.cms.gov/Regulations-and-Guidance/Legislation/FOIA/index.html).

Demystifying HCPCS code S8035 Magnetic Source Imaging

CPT Codes **95965, 95966** and **95967** were established in **Jan 1, 2002** for MEG. Prior to 2002, a **temporary code**, **S8035**, was established in Jan 1 of 2000 for MEG. **CPT Codes 95965, 95966 and 95967 take precedent over S8035**. *S8035 is not payable by Medicare*.

What is a Revenue Code and Does MEG Have One?

Revenue codes are 3-digit numbers that are used on **hospital bills** to tell the **insurance companies** either where the patient was when they received treatment, or what type of item a patient might have received as a patient. A **medical claim** will not be paid if this is missing from a bill.

Revenue codes go along with **procedure codes**. When putting them in a **charge master**, you would add the correct revenue code to the **CPT code** you were going to use for a **particular department**. It's the use of revenue codes which allows **hospitals** to use the same CPT code in multiple departments because it will show the department where the services were provided.

Since April 1, **2010** the National Uniform Billing Committee (NUBC) recommended the use of revenue code **086x** for **MEG**.

Breaking Down Six Types Of Hospital "Costs"
Reproduced by ACMEGS with permission generously provided by the author,
Mr. Michael Koppenheffer (The Advisory Board Company).

After cracking open my dusty business school textbooks and making the rounds of our finance experts, I can tell you for certain what the problem is: people are talking about **no fewer than six different types of hospital "costs."** (There are, in fact, far more, but I'm going to focus on the hospital side of the story to keep the explanation from getting completely out of hand.)

Let me outline the various types of costs for you, doing my best to use distinct terms for each one:

First of all, there are **"hospital input costs,"** by which I mean, the costs that a hospital incurs to provide care. This includes the "variable costs" of everything it takes to treat an individual patient: the salaries of nurses and techs, as well as costs of supplies and drugs. It also includes the "fixed costs" of keeping the hospital in operation, such as electricity, major pieces of equipment, and even the land and buildings. When we at the Advisory Board talk to our members about managing costs, we are often referring to these fixed and variable input costs. (CMS and other insurers sometimes track "direct" and "indirect" hospital input costs. "Direct costs" are those costs directly associated with patient care, while "indirect costs" are other costs.)

Then there are the **"hospitalization costs,"** the actual money that private insurers, patients, or the government end up paying to hospitals in exchange for providing care.

There are also **"hospital charges,"** which are essentially the hospital's list prices for their services. It's these charges that have come in for so much public scrutiny lately - which is confusing, since these charges bear little relationship to the actual "hospitalization costs" for most patients.

Finally, there is the **"total cost of care"** - the amount that an insurer expends on health care in a year on behalf on one individual.

Beyond that, there are **"health insurance costs,"** what employers and individuals pay annually in premiums to insurers for health care coverage.

And there is also the **"total cost of care for a population,"** which is the total cost of care for each person in a population, all summed up.

The one thing that each of these costs has in common? All of them have been rising, year after year! Of course, there are relationships between each of these different types of costs. When hospital input costs go up, hospitals try to increase their revenues accordingly—which often means higher hospitalization costs and higher hospital charges. And, all other things being equal, that leads to a higher total cost of care, for individuals and populations. Health insurance costs rise as a result.

But the fact that we all keep using the word "cost" to refer to so many different things is confusing and distracting even to experts, let alone to lawmakers and the general public.
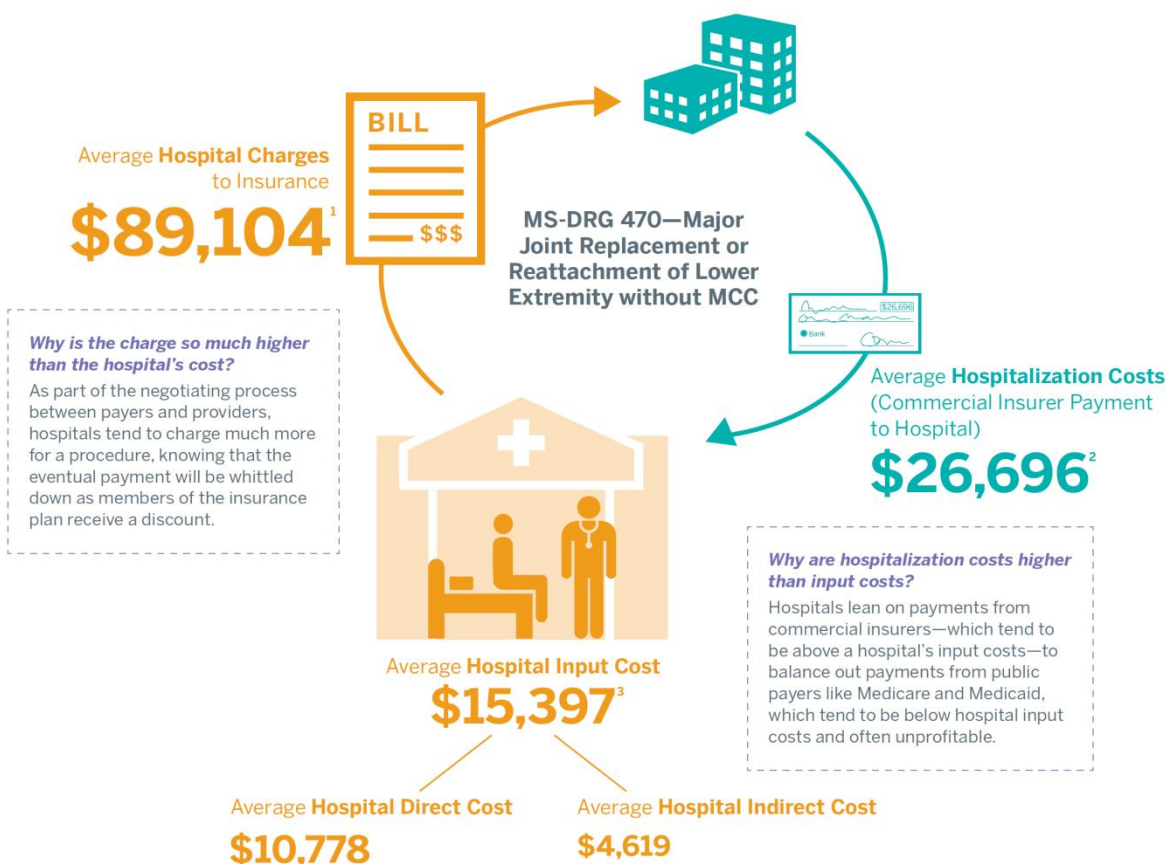
[advisory.com/costvscharges]

Telling "Costs" from "Costs" From "Charges"
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generously provided by the author, Mr. **Michael Koppenheffer** (The Advisory Board Company).
[http://www.advisory.com/research/financial-leadership-council/at-the-margins/2013/06/difference-between-cost-and-cost#lightbox/0/]

Telling 'Costs' from 'Costs' from 'Charges'

Looking at a Sample Episode of Care in Los Angeles

BILL

Average **Hospital Charges** to Insurance

$89,104[1]

MS-DRG 470—Major Joint Replacement or Reattachment of Lower Extremity without MCC

Why is the charge so much higher than the hospital's cost?

As part of the negotiating process between payers and providers, hospitals tend to charge much more for a procedure, knowing that the eventual payment will be whittled down as members of the insurance plan receive a discount.

Average **Hospitalization Costs** (Commercial Insurer Payment to Hospital)

$26,696[2]

Why are hospitalization costs higher than input costs?

Hospitals lean on payments from commercial insurers—which tend to be above a hospital's input costs—to balance out payments from public payers like Medicare and Medicaid, which tend to be below hospital input costs and often unprofitable.

Average **Hospital Input Cost**
$15,397[3]

Average **Hospital Direct Cost**
$10,778

Average **Hospital Indirect Cost**
$4,619

1) Average FY 2011 charge of the 12 hospitals in the Los Angeles market drawn from CMS database.
2) Average FY 2011 commercial insurer payment based on study conducted by Center for Studying Health System Change
3) Average FY 2012 cost to hospital determined by using the Advisory Board's Data and Analytics Group customized assessment portal and Surgery Compass.

The **Advisory** Board Company

Get our six definitions for "cost" at
advisory.com/costvscharges

MEG Teams of Texas (TexMEGs) and Medicaid Texas *(cont.)*

Many of my patients are enrolled in Medicaid, and I feel that it is very important that all epilepsy patients have access to MEG for a pre-surgical workup. When I joined the ACMEGS board of directors, one of my main goals was to work towards securing a MEG coverage policy from Medicaid, starting with Medicaid Texas.

It seemed that the most effective approach would be for all the MEG centers in Texas to work together to engage Medicaid in a dialogue regarding our current challenges in pediatric epilepsy care, including the need for a MEG coverage policy. As a first step, I contacted my Texan clinical colleagues, who also have MEGs at their institutions, namely Dell Children's Hospital (Austin) and Cook Children's Hospital (Fort Worth). We agreed to meet all during the AES meeting in Washington D.C., and on an early December afternoon last year, we all met in a Pub not far away from the convention center to discuss how we could approach Medicaid Texas in a meaningful way. **Dr. Angel Hernandez**, director of the pediatric epilepsy program at Cook Children's, said he would approach a former Medicaid director, that he knew, to find out the most appropriate and efficient way to propose our request for MEG coverage to the Texas Medicaid leadership. In early 2014, he shared this information with all of us during one of our teleconferences, and in February our team of Texas MEG centers drafted a letter to the Executive Commissioner that was signed by everyone in the group. The response came relatively prompt and indicated that the Medicaid leadership was open to discuss our issues. We then proposed a meeting at the Medicaid headquarters in Austin, and on April 29 2014, members of all three MEG programs attended the meeting. Dr. Hernandez gave an introduction to the Medicaid administrators present, followed by a jointly prepared and agreed upon presentation by **Dr. Michael Funke**, the Director of MEG at UT Houston. Important parts of the presentations were the cost savings in the care of patients with epilepsy, who are able to undergo epilepsy surgery, and the potential volume of Medicaid patients needing MEG. In addition, we had prepared a booklet "MEG in Clinical Practice" for all Medicaid representatives in the audience. It contained our MEG Fact Sheet, slides of the presentation, including case examples, important documents like the AAN MEG model policy, the ACMEGS position statement and Clinical MEG Practice Guidelines, as well as a few cardinal MEG publications.

The spirit throughout the meeting was very cordial, and one of the questions we were asked by the Medicaid representatives was why we had not approached them earlier! We left very encouraged, as it seemed clear meeting's end that Medicaid understood the necessity for a MEG coverage policy. **Dr. Dave Clarke**, chief of pediatric epilepsy at Dell Children's, invited the Medicaid representatives for a site visit at his MEG center (that is conveniently located across street from Medicaid's headquarters). This site visit happened in June. The Austin team presented a great case where MEG had made life-changing epilepsy surgery possible for one of their pediatric patients. They also demonstrated the high tech workings of a MEG Lab to their guests from across the street, who were understandably impressed.

MEG Teams of Texas (TexMEGs) and Medicaid Texas *(cont.)*

Since then, the TexMEGs team has been in weekly contact with Medicaid's Clinical Policy Team, addressing questions related to volume, cost, and ICD 9 (and 10) codes that should be covered in the policy. During this process, another letter was composed that emphasized the cost of MEG and why the cost is very different from EEG. At this point, we felt it was very important to address the topic of fair reimbursement, specifically so that mistakes from the past (the infamous Medicare cost report that does not captures MEG cost) would be prevented. All of our groups have also requested that a MEG cost analysis from each hospital administration be made available to Texas Medicaid, with the hope that the true cost of MEG will be considered for Medicaid reimbursement. One hospital has already submitted that analysis, and the other two will hopefully follow suit soon. Although the goal has not yet been accomplished, we are cautiously optimistic that we will soon have a Texas Medicaid coverage policy for MEG for epilepsy and functional brain mapping indications.

I believe that if MEG centers had tried to achieve this on their own, it would have been a very difficult. By joining forces and presenting a united front to Medicaid, we were able to present a consensus rather than individual opinions. This made it much easier for Medicaid to understand and provided them with sufficient reasons to justify an affirmative policy for MEG.

"Thanks", in a heartfelt Texan style, to the other Texas centers and team members for their positive attitudes, dedication, time and passion for MEG that helped to make this endeavor with Medicaid a likely success! I hope that it has been as much of a positive and fun experience for them as it has been for me. So here they are, the TexMEGs: **Dr. David Clarke, Dr. Paul Ferrari, Dr. Michael Funke, Dr. Angel Hernandez, Dr. Mark McMannis,** and **Dr. Freedom Perkins.** A special thank you goes out to **Linda Wasson, RN**, the MEG coordinator at Dell Children's, who took on the role of a communications officer between our groups and the Medicaid Policy Office.

Kept docs in line…

Linda Wasson, RN

If all goes well with our Texas Medicaid endeavor, we hope this will pave the way for other groups to obtain policies for MEG from their state Medicaid. Please stay tuned as our saga continues…

MEG Teams of Texas (TexMEGs)

David Clark, MD | Paul Ferrari, PhD | Michael Funke, MD, PhD | Angel Hernandez, MD | Mark McMannis, PhD | Freedom Perkins, MD

Chairman Speaks Out

Annual Course Review

The annual ACMEGS MEG Courses were held at the Westin Peachtree Plaza Hotel in Atlanta, Georgia on Wednesday, February 5. This year the courses featured a morning and an evening session. Part I in the AM, "Principles and Practice of Clinical Magnetoencephalography" was a reiteration of the previously successful series of didactic presentations covering the basics of MEG physiology, recording technology, laboratory organization, source modeling techniques and interpretation of spontaneous epileptiform activity and evoked magnetic fields. Question and answer periods were filled with active discussion on the part of attendees and faculty.

New this year was a Part II evening session devoted to individual case reviews that demonstrated the "Clinical Usefulness of MEG/EEG Source Modeling". Faculty each presented in turn a series of fascinating clinical cases of patients with medically-uncontrolled epilepsy or brain tumors that could not be adequately understood after routine pre-surgical evaluations. In each case, source modeling interictal and/or ictal MEG data provided additional insight into the pathologic process to allow crucial clinical decisions, including whether or not the patient was a surgical candidate, the location of the epileptogenic focus, and/or where to place intracranial electrodes. Given its pertinence for everyday clinical practice, this session was well received and engendered enthusiastic discussion.

Question Regarding Future Course Format

The evening session of the 2014 course was an experiment in content and timing. Clearly the content (case reviews) was a success, but a question remains regarding timing, namely evening session versus a more traditional afternoon session. Our hope was that an evening timeframe would allow many ACNS members, who were taking ACNS courses, to attend our Part II session. The response was unfortunately modest. On the other hand, the evening slot realistically carried a time constraint, so as not to interfere with dinner plans. Only two hours were available, as opposed to three plus hours in the afternoon. Accordingly, we pose the following question to ACMEGS members regarding the annual course format for 2015: Do you favor an evening or afternoon session for course Part II, Case Reviews? Please respond by email to the ACMEGS office (mkelley@acmegs.org). A simple "evening Part II" or "afternoon Part II" answer will suffice.

John Ebersole
Annual Course Chairman

Funke's Reflections

Thoughts About The ACMEGS Annual Meeting And Its Organization

When I became the Past President of our society in 2012, I was asked to continue being "chair of the meeting committee" that oversees the organization of the annual meetings (a role that I have had since 2009). The task of organizing our meetings has at least two major aspects, (1) developing the program and (2) taking care of the organizational details.

After reviewing the written comments of attendees from the annual meeting survey (the pink sheet in our program booklet), I present the best ideas and themes to our board. That happens usually during our monthly tele-conferences. These discussions with my fellow board members help in determining who would be a fine speaker for what topic. Once the preliminary program is decided, I contact speakers, always hoping that they will be available during our meeting time in early February. A personal highlight for me is inviting our special guests. Over the years we were lucky enough to be honored by true "Pioneers of Clinical MEG" speaking our meeting, such as **Bill Sutherling** in 2011. Over the years, we also invited prominent researchers and clinicians in the field of MEG from abroad, like **Stefan Rampp** from Germany and **Ritva Pateau** from Finland. At our 2014 meeting, we had the pleasure of hearing **Fernando Maestu** from Madrid give an outstanding talk about his collaboration within an international research consortium that is exploring the clinical value of MEG in the early diagnosis of dementia.

Many other aspects in organizing our annual meetings require an attention to details. It begins with selecting an appropriately sized room and equipment (hence, your early registration is appreciated so we can plan ahead of time), posting the program on our website in a timely manner, preparing the meeting booklet, designing and producing signs (and even our lapel pin), and last but not least, making culinary decisions. As long as I am chair of the meeting committee, there will continue to be smoked salmon for breakfast! When I finally scout places for a pleasant society dinner and make menu decisions, I know that the work is almost done. However, I always keep my fingers crossed that everything will work as planned and that we will have another successful and enjoyable society meeting.

Since our board decided to contract with a society management company, many of the tedious tasks in preparing for a meeting have become easier and less burdensome. You are holding one example in your hands. Beginning in 2014, abstracts of all presentations will be published in our bi-annual newsletter.
I look forward to seeing you at our 9th annual meeting in Houston in 2015.

Sincerely,
Michael Funke
PS: Do not hesitate to contact me regarding ideas, suggestions, and comments for our upcoming meetings. And you can expect another great society dinner with colleagues and friends.

2014 Annual ACMEGS Meeting

February 6, 2014
Westin Peachtree Plaza, Atlanta, GA
ABSTRACTS

1/7 Affordable Care Act (ACA) and MEG
Michael Longacre, Crofton, MD

Once again CMS has reduced the reimbursement for MEG. This presentation will focus on the potential reasons for this reduction and proposed remedies by individual MEG Centers, the AAN and the ACMEGS.

2/7 Everything You Always Wanted to Know About Source Models (But Were Afraid to Ask)
John Moran, Detroit MI

In discussions of MEG based analysis of brain activity, the topic of source models have traditionally been restricted to discussions of the merits of various forward modeling and source imaging techniques. These topics are important but highly technical and can require a high degree of nuance in their application to bioelectric imaging. Rather, important factors that underlies measurement of brain signals and subsequent construction of imaging methods are detailed. Then, the emphasis of the presentation shifts to source models which consist of interacting brain regions. In these models, most bioelectric source activity is determined by received signals from other regions. Thus, a network source model is mathematically constrained to account for these network interactions as well as explain the measured MEG data. In particular, a network source model is constructed where MEG coherence imaging is used to identify active network sites while fiber tract based connectivity determines the physical site-to-site connections. Clinical utility of this approach is demonstrated by identifying the site of an epileptic focus based completely on subsequent parameter analysis of the constructed epileptic source model network. ▶

3/7 Whole-Brain Functional Connectivity in Focal Epilepsy
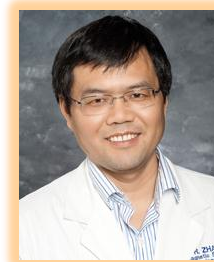
Deepak Madhavan, Omaha, NE

The analysis of interictal epileptiform discharges (IEDs) using magnetoencephalography (MEG) is utilized for the localization of seizure onset zones in the presurgical planning of epilepsy patients. Additionally, resting-state functional connectivity analyses using the IED area may provide novel insight into the underlying brain networks. In this study, we evaluate whether chronicity of seizures is related to whole-brain functional connectivity metrics using the area of IED generation (derived from MEG) as the seed region. We found a positive correlation between the duration of seizures and beta-band functional connectivity between the epileptogenic zone and other brain areas. This suggests the presence of inhibitory GABAergic modulation of distal brain regions in response to chronic epileptiform activity. We are also trying to extend this concept to explore functional connectivity based relationships between intracranial EEG and MEG, in order to develop presurgical analysis protocols.

4/7 Clinical Application of MEG Source Connectivity Analysis

Wenbo Zhang, Minneapolis, MN

MEG/MSI has been approved for pre-surgical epileptogenic zone localization for more than 10 years. Epileptogenic zone can be defined by MEG when interictal magnetic fields clustered. However the MEG network study of epilepsy remains scarce, especially for neocortical epilepsy. eConnectome (Electrophysiological Connectome) is an open-source MATLAB software package for imaging brain functional connectivity from electrophysiological signals. It provides interactive graphical interfaces for EEG/ECoG/MEG preprocessing, source estimation, connectivity analysis and visualization. Connectivity from EEG/ECoG/MEG can be mapped over sensor and source domains. It is free for download at http://econnectome.umn.edu . Cases will be presented analyzed with the methodology. It provided a robust way to analyze source connectivity of MEG/MSI using directed transfer function (DTF) analysis. More case analysis should be done to better understand the clinical significance of DTF analysis. In conjunction with diffusion tensor imaging tractography, a more complete picture of interictal epilepsy network can be drawn.

2014 Annual ACMEGS Meeting ABSTRACTS (cont.)

5/7 MEG Results In The Operating Theater: How We Do It
Anto Bagić, Pittsburgh, PA

Rapid progress towards filmless and remote radiology opened many new possibilities in an effective and creative use of imaging in clinical practice. While cardinal obstacles for effective multimodal image integration are eliminated, seemingly "multiple solutions" in a particular institution do not translate into a streamlined logistics for an easy integration of MEG/MSIs into PACS (picture archiving and communication system) without a lot of concerted efforts. A rigid "group think" of various IT entities is the main obstacle along with device vendors who are sub optimally disposed and "it is not that rare" that the devices produced by the same vendor don't communicate seamlessly. Currently, in most places, invested MEG clinicians have to facilitate focused team efforts on eliminating fatal "remaining trivialities". Sadly, many prestigious institutions that have technological prerequisites did not attain practical routine PACS integration of MSIs with all positive implications. The Pittsburgh example of full MSI integration in PACS will be shared. Easy access to MSIs and their seamless integration with other imaging modalities is one of the critical steps for further acceptance of MEG as a routine clinical tool among neurosurgeons that is necessary for the clinical MEG field's survival and advancement.

6/7 Why and What Biomarkers are Ideally Needed
Jim Becker, Pittsburgh, PA

HIV disease includes a set of conditions referred to as HIV-Associated Neurocognitive Disorder (HAND); even a mild form of HAND can result in significant alterations in employment, medication adherence, driving ability and other aspects of daily life. Identifying the earliest indications of neuropathology is critical for the development of therapies. Unfortunately, there is no acknowledged neuroimaging biomarker that can identify the pathological substrate of HAND; the identification and differential diagnosis of HAND is limited to the clinical signs and symptoms. Our research team has been exploring the relative merits of magnetoencephalography (MEG) as a potential HAND biomarker, because it measures neuronal activity directly from the magnetic fields induced by neuronal currents. MEG does not rely on the blood-oxygen level dependent response to generate responses, and has the best tradeoff between spatial and temporal resolution of any current neuroimaging technology. MEG can identify individuals with HIV Disease, the MEG responses change with recovery from HIV-Associated Dementia, and the findings are stable over 6-months. Because MEG directly measures the activity of neuronal populations, it provides unique information regarding the pathophysiology of HAND that cannot be obtained from other neuroimaging modalities. Consequently, MEG should detect brain functional abnormalities prior to clinical symptomatology.

2014 Annual ACMEGS Meeting ABSTRACTS (cont.)

7/7 First Results of the Multi Center MAGIC AD Study
Fernando Maestu, Madrid, ES

In the last years, MEG field is experienced tremendous advances in its new clinical aplications. Dementia is one of those where greater advances are taking place, especially in Alzheimer´s Disease (AD). In fact functional connectivity measures are being testing AD as a dysconection syndromes. Thus, in the early stages of the disease Mild Cognitive Impairment patients showed increased synchronization and those that developed dementia showed higher synchronization than those that did not develop dementia. Correlations with anatomical conectivity and amyloidosis has been found as well. Despite of all these scientific evidence it was needed an international blind study. In an international multicenter study, we used magnetoencephalography and functional connectivity metrics to evaluate the ability to differentiate Mild Cognitive Impairment (MCI) from normal aging at the individual level. Data mining techniques were using for extracting features (links) to classify participants as MCI or controls using samples of already known patients and controls (learning stage) and from unseen data from five different centers. We identified a pattern of neuronal hypersynchronization; the features of the network that best discriminated MCI were fronto-parietal and interhemispheric. When this model was tested in an unseen sample the sensitivity was 1.00, specificity of .69 and overall total accuracy of .83. We report here the first use of neuronal functional connectivity data to discriminate between MCI patients and healthy elderly subjects at the individual level. The hypersynchronization pattern found in the MCI patients may be considered an early sign of synaptic disruption and a possible preclinical biomarker for MCI/AD.

See you at
2015 Annual ACMEGS Meeting
February 5th, 2015
Houston, TX

2015 Course And Meeting Programs

2015 ACMEGS MEG Course
Wednesday, February 4, 2015
JW Marriott Houston • Houston, Texas

AGENDA

Part I: Principles and Practice of Clinical Magnetoencephalography

Time	Session	Speaker
8:00 AM	Registration/Breakfast	
8:30 AM	Welcome/Introduction	John Ebersole, MD
8:35 AM	Neurophysiological Basis and Recording Fundamentals of MEG and EEG	Richard Burgess, MD, PhD
9:25 AM	MEG Lab Organization and Data Acquisition	Anto Bagic, MD, PhD
10:15 AM	Break	
10:30 AM	Dipole Modeling of Epileptiform Activity	John Ebersole, MD
11:20 AM	Source Modeling of Evoked Activity	Michael Funke, MD, PhD
12:10 PM	Questions/Discussions	Faculty
12:30 PM	Lunch	

Part II: Clinical Usefulness of MEG/EEG Source Modeling: Case Reviews

Time	Session	Speaker
1:30 PM	Introduction to Cases	John Ebersole, MD
1:35 PM	Pediatric and Adult Case Presentations	Gretchen Von Allmen, MD; Richard Burgess, MD, PhD
3:00 PM	Break	
3:15 PM	Case Presentations (continued...)	Anto Bagic, MD, PhD; John Ebersole, MD
4:30 PM	Closing Remarks/Farewell	John Ebersole, MD

CME INFORMATION

Educational Needs: Digital processing of EEG and MEG is required to utilize fully the clinical information in these signals. Few training programs provide with experience with these forms of advanced data analysis, which creates a significant gap between current levels of practice and what is ideally needed. This program provides both didactic and workshop experience with advanced analysis methods for source characterization and localization using clinical MEG and EEG data. This experience will enhance competence in modern clinical magnetoencephalographic and electroencephalographic techniques.

Learning Objectives: At the conclusion of this program, the learner should be able to: **1.** Describe the underlying physics of MEG generation and recording; **2.** Describe the most common and efficient organization of an MEG laboratory; **3**. Identify epileptiform MEG waveforms with and without EEG correlates; **4**. Process MEG and EEG data with source localization software; **5**. Interpret dipole models of MEG and EEG epileptiform spikes and normal evoked fields; **6**. Distinguish abnormal MEG transients from normal variants; and **7**. Provide a localization of MEG and EEG activity to aid in presurgical epilepsy evaluations.

Target Audience: This educational activity is directed to clinical neurophysiologists, neurologists, psychiatrists, physiatrists, neurosurgeons, trainees in these disciplines and other physicians and researchers who utilize clinical neurophysiological techniques and knowledge in the diagnosis and management of patients with disorders of the nervous system.

Accreditation Statement: This activity has been planned and implemented in accordance with the Essential Areas and Polices of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the American Clinical Neurophysiology Society (ACNS) and the American Clinical Magnetoencephalography Society (ACMEGS). ACNS is accredited by the ACCME to provide continuing medical education for physicians.

Credit Designation: ACNS designates this activity for a maximum of **6.5 *AMA PRA Category 1 Credit(s)*™**. Physicians should claim only credit commensurate with the extent of their participation in the activity.

2015 ACMEGS Annual Conference
Thursday, February 5, 2015
JW Marriott Houston • Houston, Texas

8:00am	Arrival / Breakfast Reception

8:45am **ACMEGS Presidential Address 2014**
Welcome and Introduction - Anto Bagić, Pittsburgh

9:00am **Current Issues and Controversies in Pediatric MEG**   Chair: **Gretchen Von Allmen**, Houston
- *Anesthetic Management on Quality in Pediatric MEG Patients* - Douglas Rose, Cincinnati
- *Pediatric MEG: The Effect of Head Positioning on SEF* - William Gaetz, Philadelphia
- *Passive Language Mapping with MEG in Pediatric Patients with Epilepsy* - Dave Clark, Austin
- *MEG Localization of Broca's Area Using Verb Generation Tasks* - Elizabeth Pang, Toronto

11:00am **Platform Presentations**   Chair: **John Ebersole**, Summit

12:00pm **Annual ACMEGS Photo Shoot** / Lunch

1:00pm **New and Novel Applications of MEG: Results from the Field** Chair: **Richard Burgess**, Cleveland
- *Complexity Analysis of MEG in Traumatic Brain Injury Patients* - Richard Bucholz, St. Louis
- *Neonatal Bedside Magnetoencephalography* - Yoshio Okada, Boston
- *Neural Synchrony Examined with MEG During Eye Gaze Processing in Autism Spectrum Disorder* - Renee Lajiness-O'Neill, Detroit
- *Abnormal MEG Coherence Imaging in Panic Disorder* - Nash Boutros, Kansas City

2:30pm Coffee Break

3:00pm **Update on Educational Initiatives**   Chair: **Anto Bagić**, Pittsburgh
- *Update on MEG Fellowship Curriculum - Richard Burgess, Cleveland*
- *Our Experiences: A Report from MEG Fellows*
- *Update on MEG/EEG-Technologist Activities - Janice Walbert, ABRET & Brian Markley, ASET*

3:45pm **ACMEGS Lecture 2014**
The First Biomagnetic SQUID Measurement - David Cohen, Boston

4:30pm Meeting Adjourn

4:40pm **Business Meeting**   Chair: **Anto Bagić**, Pittsburgh
- *Affordable Care Act (ACA) and MEG - Michael Longacre, Crofton*
- *Financial Report - Susan Bowyer, Detroit*
- *Public Relations Committee - Paul Ferrari, Austin*
- *Elections and New Business*

6:00 pm **ACMEGS** Dinner - Location TBD

Public Relations Committee

By *Susan Bowyer*

This year we have focused on increasing the exposure of ACMEGS to colleagues, other neurologists, researchers, and technologists through our presence at the AES, ACNS, ASET, Biomag, and IEC meetings. The delicious chocolates that we offer at our booth help get our message across. We have expanded the advertising of our annual ACMEGS Course and Meeting as well. Next year we will be at the JW Marriott in Houston, Texas for our February 4th course and February 5th meeting. The course will include instructional lectures in the morning and clinical case reviews in the afternoon after lunch. The annual meeting promises a series of lectures on current MEG practices, as well as potential future applications.

This is our second Newsletter. It is meant to distribute timely and useful information for clinical MEG personnel. Our Website at ACMEGS.org is also a great resource. There you can review clinical practice guidelines, find internet access to sign up for the ACMEGS annual meeting and/or course, view a map illustrating the locations of all clinical MEG centers, and find contact information for all these centers.

The ACMEG Society is here to advocate for all individuals with neurological conditions, who would benefit from MEG, by educating policymakers and regulators about current and recommended standards of care, financial reimbursement, and health care provider regulations. Our ACMEGS Mission is **t**o ensure that all individuals who have neurological conditions receive the highest quality health care including magnetoencephalography that is clinically indicated and now approved by insurance providers.

Society Overview

Accomplishments

Fiscal year 2014 was a testimony to our mission of education. This was our third year that we offered an annual course in conjunction with our 9th Annual meeting   Attendance to both has grown, and we are optimistic that we will continue to increase our audience (2013 attendees: meeting ~ 20, course ~ 15; 2014 attendees: meeting - 47, course - 28). Noteworthy was that we did not have to increase in the cost of attending our annual meeting and course.

Public Relations Committee

Membership / Operations

Our society has 17 MEG center members and 53 individual members. Currently there are 42 research and clinical centers in the USA and Canada.
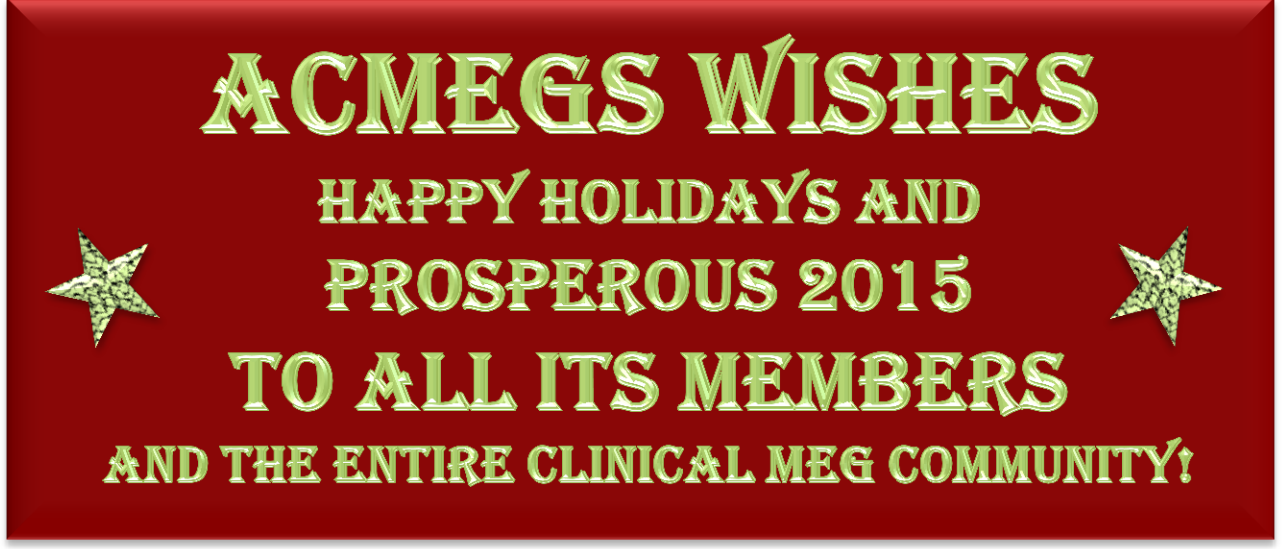
Communications / Public Relations

We had a presence at five scientific and professional meetings [**AES, ACNS, ASET, Biomag** and **IEC**]. In the future, we hope to expand to more neurology and neurosurgical conferences.

Professional Development

Our first webinar, which was developed with Elekta, was given by **Richard Burgess** from the Cleveland Clinic. The link to this webinar is posted on the website under Education and Resources.

Future Outlook

ACMEGS continues to seek feedback from our members regarding the development of new programs and services. Our fiscal status is sound, and we will continue to work within our conservative budget. We are unwavering in our commitment to education and research.

ACMEGS WISHES

HAPPY HOLIDAYS AND PROSPEROUS 2015 TO ALL ITS MEMBERS AND THE ENTIRE CLINICAL MEG COMMUNITY!

ACMEGS Activities And Resources Focused On Advancing Clinical MEG

❑ ACMEGS acts as the **united voice of clinical MEG centers to** maintain a national focus in the areas of MEG clinical practice, education, government regulation and third party reimbursement.

❑ ACMEGS is a **comprehensive, yet practical resource** for all areas that are important for clinical MEG practitioners, technologists, and administrators.

❑ ACMEGS is the only professional organization offering an extensive **Annual Clinical MEG Course,** that provides ACCME credits to participating physicians and ABRET-CEUS to participating technologists.

❑ ACMEGS organizes and sponsors an **Annual Clinical MEG Conference** that highlights recent developments, including economic aspects, and current research in the field. This conference is the best venue for both new and established clinical MEG sites to stay on top of evolving MEG topics.

❑ ACMEGS **maintains relationships** with key clinical, government, scientific and charitable organizations and decision makers on matters affecting patient care.

❑ ACMEGS is committed to developing documents that **provide useful guidance** for the further growth of clinical MEG, including practice guidelines, position statements on relevant topics, educational and applicable model policies (e.g. insurance coverage policies, center policies, etc.).

❑ ACMEGS is continually seeking opportunities to **promote the specialized services of MEG centers,** and to improve coverage and payment for services in both the public and private insurance arenas.

Additional Benefits Of CENTER Memberships

❖ Exclusive free access to the ACMEGS reimbursement expert consultant;

❖ Exclusive access to the members only resource section of the ACMEGS website (*in progress*);

❖ Two (2) complimentary representative memberships with voting rights at no additional charge;

❖ Discounted registration to the Annual Course and Conference for ALL individual members employed by the Center;

❖ Subscription to the ACMEGS Newsletter;

❖ Listing on the ACMEGS.ORG website for ease of patient referrals to YOUR MEG center;

❖ Free posting on our employment site for targeted recruitment of engineers, scientists, technologists, and physicians focused on MEG;

Benefits of INDIVIDUAL Membership

✓ Discounted registration rates for the Annual Clinical MEG Course and Conference;

✓ Invitations to a formal dinner for social and professional networking at no extra cost for member registered to attend the Annual Conference;

✓ An attractive ACMEGS lapel pin; (put a lapel pin picture here as well);

American Clinical MEG Society

ACMEGS *News Letter*

Upcoming Conferences and Courses

ACMEG Clinical Course 2015   (Houston, TX: February 4th, 2015)
ACMEGS Annual Meeting 2015   (Houston, TX: February 5th, 2015)
ACNS Annual Meeting & Courses 2015 (Houston, TX: February 3 – 8, 2015)
ISACM 2015   (Helsinki, Finland: June 23 - 26, 2015)
AES 2015 Annual Meeting   (Philadelphia, PA: December 4 - 8, 2015)
ACMEGS 2016 Annual Meeting   (San Diego, CA: March 14, 2016)
ACNS 2016 Annual Meeting   (San Diego, CA: March 13 - 17, 2016)
Biomag 2016   (Seoul, Korea: October 1 - 6, 2016)

ACMEGS Officers

Anto Bagić M.D., Ph.D.
President

Susan M. Bowyer, Ph.D.
Treasurer

Richard Burgess M.D., Ph.D.
Board Member

John Ebersole M.D.
Board Member

Paul Ferrari, Ph.D.
Board Member

Gretchen Von Allmen M.D.
Board Member

Michael Funke, M.D., Ph.D.
Past President