Suggested outline for ESME Report

Name:
Post held:
Institution:
City:
Country:

Background

I am a junior faculty member, a general internist who teaches medical students and residents in cardiology and neurology clinical skills. The Director of the Internal Medicine Residency Program contacted me to set up a neurology clinical skills curriculum for first-year residents. There has been a growing concern that internal medicine residents were deficient in core neurology clinical skills. It had been recognized that there was no formal curriculum and residents were dependent on the chance exposure to patients with neurologic diseases and faculty who would teach about these patients. The residency program was especially motivated by the need to document teaching and assessment of ACGME competencies and wanted to use this experience as a pilot for an institutional change in their curriculum

After an initial meeting with the Program Director and other teaching faculty, it was decided that the curriculum would involve first-year residents during their mandatory 4-week general medicine ambulatory rotation.

This portfolio provides evidence for the course that has just been developed and reflects application of the themes and principles outlined in the Essential Skills in Medical Education (ESME). The portfolio contains examples of how I applied several of the ESME competencies to my teaching.

Course

Review Course in Clinical Neurology for Internal Medicine PGY-1's during a General Medicine Ambulatory Rotation

Theme 1 – What should the learner learn? - Learning Outcomes

I knew my first task would be to define the learning outcomes – what did I expect the residents to be able to do at the end of the rotation? I used the 12 outcome frameworks as adopted in the "Scottish Doctor" The learning outcomes most relevant to this course are:

Clinical Skills

- Perform an accurate and appropriate neurologic examination
- Identify key neurologic findings on examination

1.	Normal eye movements	16.	Wrist drop
2.	Normal arm coordination	17.	Foot drop
3.	Flexor plantar response	18.	Sensory level to pinprick
4.	Normal gait	19.	Distal pinprick loss
5.	Lateral Rectus Palsy	20.	C6 pinprick loss
6.	Neglect	21.	L5 pinprick loss
7.	Expressive Aphasia	22.	Ankle clonus
8.	Receptive Aphasia	23.	Extensor plantar response
9.	Dysarthria	24.	Intention tremor

10.	Swollen Optic Disk	25.	Essential Tremor
11.	Hemianopsia	26.	Resting Tremor
12.	Cranial nerve 3 palsy	27.	Choreoathetosis
13.	Facial weakness	28.	Ataxic gait
14.	Atrophy and fasciculation	29.	Parkinsonian Gait
15.	Pronator drift	30.	Romberg sign

- Describe the significance of key clinical findings on the neurologic examination
- Distinguish patients with common ambulatory neurologic complaints vs. neurologic emergencies

Patient Investigation

- Recognize pertinent negatives and positives on history and examination that help one formulate an accurate differential diagnosis
- List the appropriate labs to order
- Describe the appropriate diagnostic imaging studies to order

Patient Management

- Distinguish acute from chronic medical conditions
- Describe the acute as well as the long term management of medical conditions
- Become familiar with commonly used medications used to treat these conditions
- Describe the associated side effects of these commonly used medications
- Recognize key counseling aspects regarding certain medical conditions
- Distinguish normal and abnormal CT and MRI of the brain

Health Promotion

- Within each of the 20 core curriculum topics learner should:
  - Recognize causes of threats to health and individuals at risk
  - Implement secondary prevention strategies
  - Collaboration with other health professionals in health promotion and disease prevention

Communication

- Demonstrate professionalism during a neurologic examination (OSCE) with a standardized patient

Information Handling

- Portfolio (personal log book): Intern should maintain a personal log book containing brief history, exam, pertinent labs and diagnostic studies, assessment and plan of patients with neurologic complaints assessed and managed at the ambulatory medicine clinic.

Understanding Basic and Clinical Sciences

- Describe the pathophysiology, clinical course and management of 10 common ambulatory neurologic conditions
- Describe the pathophysiology, clinical course and management of 10 of key neurologic emergencies
- Identify and describe the neuroanatomy and pathophysiology associated with key neurologic findings
- Identify key neurologic structures on CT and MRI scans
  a. Brainstem (medulla, pons, midbrain) and cerebellum

b. CSF structures: all 4 ventricles, Sylvian aqueduct, quadrigeminal plate cistern, perimesencephalic cistern, suprasellar cistern, Sylvian fissure, intrahemispheric fissure
c. Deep white matter: internal capsule, corona radiata, and centrum semiovale
d. Subcortical gray matter: thalamus, lentiform nucleus (globus pallidus and putamen), caudate nucleus
e. Cortex: frontal, parietal, temporal, occipital, insula

Appropriate Attitudes and Ethics

The residents are required to visit our center one half-day per week for four weeks. The students are assigned to review a specific neurology computer-based program during each session. Upon completion of the assignment, they are given time for independent learning, where the student focuses on 20 core curriculum topics. The core curriculum is mostly self-directed, self-paced computer based learning. We track attendance as well as time spent reviewing the programs. We feel these outcomes reflect learner effort, attitude and motivation. In addition, on the last day of the course residents fill out a learner opinion survey where they have the opportunity to rate the educational quality and value of the programs as well as any additional comments and feedback they can provide.

Personal Reflection:
Prior to the development of this curriculum first year residents participated in a one month mandatory neurology rotation. Two weeks were spent on the neurology wards and two weeks were spent on the neurology consult service. As a recent graduate and participant of this rotation, I am now clearly aware of the multiple reasons this rotation was not successful. Residents needed more direction, more instruction and guidance regarding what we needed to learn and what was expected. In addition, our experiences on the wards varied as well as our exposure regarding patient findings. I feel the ward experience is still critical in the learning process, but outcomes need to be made clear.

"When both faculty and students understand clearly what is expected, they will figure out a thoughtful way to get there."

Stephen R. Smith & Richard Dollase. Brown University School of Medicine. AMEE guide No. 14: Outcome Based education: Part 2-Planning, implementing and evaluating a competency-based curriculum

The development of clear, detailed outcomes is imperative when developing a curriculum. We should ask ourselves, with what "knowledge, skills and attitudes" do we want these first year residents to leave this rotation with? Broad objectives with unclear endpoints are not sufficient.

Outcome-based education, as defined by Spady (1988) is "a way of designing, developing, delivering and documenting instruction in terms of its intended goals and outcomes," "Exit outcomes are a critical factor, in designing the curriculum, Spady suggest, "You develop the curriculum for the outcomes you want students to demonstrate, rather that writing objectives for the curriculum you already have."

Spady WG (1988). Organising for results: the basis of authentic restructuring and reform. Educational Leadership October: 4-8.

Theme 2 – How should the learner learn it? – The FAIR Criteria

I knew that regardless of the teaching method chosen, I would incorporate the FAIR principles that lead to effective learning – feedback, activity, interest, relevance.

Feedback

1. Pre-test questions (based on course outcomes) and final scores - with matched learning objectives- are given to the interns to help guide and focus their learning throughout the course. This not only provides summative and formative feedback but also stimulates adaptive learning by providing students the opportunity to customize their learning plan based on performance.

2. Computer programs used throughout the course contain embedded multiple choice questions with explanations of correct and incorrect answers that reinforce key teaching points, as well as self assessment modules at the end of each program. These programs engage the learners by providing an interactive environment as well as immediate feedback.

3. Residents are provided with hands on formative feedback after completing their Post-Course Neurology OSCE (based on the Essential Neurologic examination) on the final day of the course.

Personal Reflection:
I acknowledge the following statement from my personal readings: *"To promote learning educations should be educational and formative – students should learn from tests and receive feedback on which to build their knowledge and skills. Pragmatically, assessment is the most appropriate engine on which to harness the curriculum."*

Waas V, Van der Vleuten C, Shatzer J, Jones R. Assessment of clinical Competence. The Lancet.357:945-959.

Activity

1. Computer assisted learning
  a. Self directed/Self paced
  b. Interactive
  c. Patient based
2. Power point teaching programs based on 20 core Neurology topics
  a. Self directed/Self paced

Interest or Individualization

One unique component of our curriculum is its focus on "Individualization." On the first day of the course the residents are given a pretest based on course outcomes. Shortly after, residents are given their scores as well as the learning objective for each question. Students use this as a guide to customize their learning plan during the independent learning sessions for the remainer of the course. They are free to focus on areas of weakness, areas they may personally feel they need to review or they can review areas of special interest. Their curriculum is customized based on pretest performance.

Personal Reflection: Curriculum content does not need to be a "one size fits all" process. Heavy workload, work hour restrictions and variability in resident baseline knowledge and skills may make individualized curriculum promising when used in the appropriate setting.

Clark notes, ""we are failing to recognize a basic lesson in the psychology of learning: that individuals matter and individuals needs must be catered for. This is best done by allowing the user to have a high degree of responsibility for his or her own learning. But before they get anywhere near the learning, a needs analysis that is truly diagnostic would mean better targeted training, less wasted effort and less failure."

Clark Donald. Psychological myths in e-learning. Medical Teacher, Vol.24, No. 6, 2002, pp. 598-604.

Relevance

Because these are adult learners who are taking care of patients I knew we needed to make the curriculum directly relevant to their daily practice. I also knew it had to address the needs of the training program and satisfy any national guidelines or requirements.

- Neurology is part of the Federal Council of Internal Medicine (FCIM) curriculum

    "The FCIM has developed a resource guide to help internal medicine residency programs produce internist who are prepared for today's practice of Internal Medicine and the challenges of practice in the future. It identifies the learning experiences that should be a part of general internal medicine training, list the clinical competencies that are important for primary practice, and describes the role of integrative disciplines that should inform the care of every patient."

    Ende J, Kelley M, Sox H. The Federated Council OF Internal Medicine's Resource Guide for Residency Education: An instrument for Curricular Change. Annals of Internal Medicine 1997;127(6):454-7.

- Neurology is part of the American Board of Internal Medicine (ABIM) 4%

- Due to the increasing aging population, internist will be faced with patients with an increasing number of neurologic complaints. Future internist and primary care physicians need to be better equipped to identify and appropriately manage these problems. This call for improvement could lead to earlier diagnosis, improved patient safety and cost effective management.

- Extensive patient videos within the curriculum provide actual findings similar to ones they will see in future patients, rather than a narrative description of findings typically included in lecture or textbooks. These videos also ensure exposure to all essential key clinical findings often not encountered on the wards due to variability in ward experience.

Theme 2 – How should the learner learn it? - Teaching and Learning

Clinical Skills: Computer-Based Neurologic Exam Program
                    Computer-Based Neurology Essential Findings Program
Patient Investigation: Integrated in the Computer Based power point sessions
Patient Management: Integrated in the Computer Based power point sessions
Health Promotion: Integrated in the Computer Based power point sessions
Understanding Basic and Clinic Sciences: Integrated in the Computer-based programs

Personal Reflection: Heavy workload and time constraints during residency training has lead to less time for structured learning as well as less time for faculty involvement and supervision. Computer-based learning, especially web-based learning, can be used anywhere, anytime, is less faculty dependant and may easily fit into a busy residency schedule. In addition, it can provide learners with standardized curriculum content and the use of patient videos ensures exposure to key clinical findings.

Theme 3 – How can the learning be organized in the curriculum? - *SPICES model*

There are several challenges to develop and integrate a new course into an existing training program that has competing activities. The SPICES approach was particular useful in providing a framework that addresses several of the important issues.

Student Centered --------X------O-------------------------------Teacher Centered Approach

The course structure is a more "student-centered" approach. We identify the core curriculum as well as the course outcomes. Students are given their pretest scores and identified areas of weakness. Thereafter, the student chooses to focus on the programs that they would like to review. Some focus only on their areas of weakness, others work on areas of weakness as well as other areas of interest they feel need review. They can take as much time as they like reviewing the programs. They can use the programs at assigned times or on their free time. They decide the sequence and pace of their learning.

Problem Based   -------- -X------------------------O------------------Information Gathering

One of the computer programs we use is problem-based. The program begins with a patient case and the teaching throughout the program is based around that patient presentation. However, many of the other teaching programs are not patient based. We are in the process of converting these programs into case based teaching programs. Learner feedback from our course reflected that the teaching programs developed around a patient case were more stimulating and engaging.

Integrated Teaching------X-------O----------------------------------Discipline Based

Our neurology curriculum which is mostly computer based instruction combines clinical neurology, with neuroanatomy to help explain lesion localization as well as neuroradiology. In addition, our core curriculum is based on topics that would be most relevant to medicine.

Community Based ------X------ -O---------------------------------Hospital Based

The neurology curriculum is presented during an ambulatory medicine rotation. Feedback from our pilot course has demonstrated that during the rotation, residents realize that neurologic complaints are quite frequent in the primary care setting and this reinforces the need to be better equipped and prepared to handle these neurologic problems.

Electives ----------------------NA--------------------------------------Standard Program

This course is a required component of the 4-week ambulatory medicine rotation for first-year residents. From the beginning, we had support from the program directors and chief residents to ensure this activity was required.

Systematic Approach------X-----O --------------------------------Apprenticeship or opportunistic prog.

Ward experience and clinical exposure vary. Our Computer-based neurology clinical skills program identifies the essential key clinical findings an internist should know emphasized in the American Academy of Neurology Core Curriculum. The program contains patient vides of each of these findings, along with a description and correlation with the lesion localization. These patient videos ensures exposure to findings that may not always be encountered by every resident due to the variability in ward and clinic experiences.

Theme 4 – How do you know if the learners have learned it?

Outcomes-based Assessment

Outcomes:	Assessment
Clinical Skills	OSCE, Computer based MCQ
Patient Investigation	Computer based MCQ
Patient Management	Computer based MCQ
Health promotion	Computer Based MCQ
Communication	OSCE
Personal Records	Portfolio (Patient Log)
Basic and Clinical Sciences	Computer based MCQ
Attitudes and Ethics	OSCE

Personal Reflection:
OSCE
On the first and last day of the course the students are given 10 minutes to perform the essential neurologic examination. During this pre- and post- course OSCE, we observe the residents perform the neurologic examination on a standardized patient, using a checklist. During the OSCE we not only evaluate clinical skill, but the resident's skill in communicating and interacting with the patient during the neurologic exam and we provide feedback on their performance.

Portfolio:
Residents keep track of neurology cases seen in their ambulatory medicine clinic. Students fill out a form that includes a brief description of the following: patient diagnosis, history, pertinent examination findings, pertinent labs, diagnostic studies and assessment and plan. This provides evidence of learning and allows us to observe if students are applying what they are learning in the clinical setting and if they are achieving the learning outcomes. In addition, collecting this information is allowing residents to realize that neurologic complaints are common in the primary care setting and internal medicine residents need to be prepared to identify, diagnose and manage these patients.

Theme 5: The Roles of the Teacher and the Scholarly Educator

Role	Description
Information Provider	• On orientation day, I conduct a brief round table discussion describing the course goals and outcomes. Residents are given a packet with the detailed course outcomes. I review the schedule, overall goal of the course and review the list of outcomes they are expected to achieve. • After their post-course OSCE I conduct a hands-on feedback session based on their performance.
Role Model	• As a teaching role model I feel I demonstrate enthusiasm in neurology and particularly try to emphasize the important role neurology plays in internal medicine particularly in the ambulatory setting.
Facilitator	• Because this is mostly a computer based curriculum, my daily role is mainly as a facilitator. I am present during their half day sessions to answer questions and provide feedback.
Assessor	I plan and prepare the pre- and post-course OSCE session. I evaluate performance using a checklist.
Planner	• I have developed detailed learning outcomes and provide assessment that is aligned with course content and outcomes.
Resource Developer	I am part of an expert group that specializes in the development of these computer based teaching programs. I have played an active role in the development of these programs. I have assisted in the development of content, obtaining patient videos and developing patient cases.

Final Reflection:

Thoughtful application of the themes and principles outlined in the Essential Skills in Medical Education (ESME) has allowed me to create a neurology course that is outcomes based and follows the principles of curricular alignment. Careful evaluation using the *FAIR criteria* and the *SPICES model* has highlighted areas in the curriculum that have been successful but also pointed out key areas that may need reevaluation and further modification. I plan to improve the curriculum in areas such as feedback and making the core curriculum more "problem-based."

We have been collecting data on resident performance for the last 8 months. Pre-course OSCE skills checklist scores are usually surprisingly low. First year residents have difficulty recalling all the components of the neurologic examination and many of the components of the exam that are performed are done incorrectly and could potentially lead to missed

findings and inaccurate diagnosis. Post course OSCE's have shown significant improvement in resident neurologic examination skills.

Lessons Learned:
The neurology examination can be lengthy and not routinely done, learners may quickly lose their skills. Revisiting the essential components and appropriate technique of the neurologic examination with repetitive practice, review and assessment throughout residency, may be key in maintaining this essential clinical skill.

Adaptive computer-based learning may provide a unique opportunity for Internal Medicine Residency programs to provide assessment, customized learning, and documention of competencies. Heavy workload, work hour restrictions and variability in residency baseline knowledge and skills may make this type of instructional method promising. In addition, computer-based assessment tools using patient videos have demonstrated evidence of validity as a measure of clinical competence[1] and can be an effective supplement during residency training.

This course also demonstrates the use of an assessment tool to provide formative feedback and drive individualized curriculum. As an example of further evidence of scholarship, we are currently submitting a proposal for a peer reviewed grant based on the use of an assessment tool to provide formative feedback and drive individualized curriculum. In the appropriate setting, an efficient curriculum may not only be outcomes based but also outcomes driven. "Outside of medical education, studies of WBL tools adapting to prior knowledge suggests improved outcomes and decreased time required to learn the material. There are no studies documenting this in medical education."[2] In addition, a recent article by Cook calls for research involving the comparison of instructional methods using computer-based learning.[3] This future study will focus on a specific feature of computer-based learning, adaptation to learner needs, and thus may help to determine whether this type of instructional method incorporating individualized formative feedback, improves learner efficiency, outcomes and retention.

References
1. Obeso VT, Gordon DL, Issenberg SB, et al. Innovative Uses of Technology: A Multicenter Study to Provide Evidence of Construct Validity in a Computer-Based Outcome Measure of Neurology Clinical Skills. Academic Med. 2005:80 S71-74.

2. Cook David. The research we still are not doing: An agenda for the study of computer-based learning. Academic Medicine. 2005; 80(6) 541-548.
bid.

3. ibid.

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