The Capstone Course – Who, What, Where?

Results of the 2012 CDEM survey
David A. Wald, DO

20 Capstone programs

Year course was first offered (n-19)

- 2012-2013 (will start this year) 4 programs
- 2011-2012 1 program
- 2010-2011 2 programs
- 2008-2009 1 program
- Before 2008-2009 11 programs

Length of course (n-17)

- 4 weeks 6 programs
- 3 weeks 1 program
- 2 weeks 7 programs
- 1 week 3 programs

Use of high fidelity simulation (n-20)

- Yes 16 programs
- No 4 programs

Use of standardized patients (n-19)

- Yes 9 programs
- No 10 programs

Use of task trainers (n-20)

- Yes 14 programs
- No 6 programs

Procedural training (n-18)

- Yes 14 programs
- No 4 programs

EM faculty leadership (n-20)

- Runs the Capstone course 11 programs
- Runs part of the course 6 programs
- No 3 programs

EM resident participation (n-20)

- Yes 11 programs
- No 9 programs

NIGHT ON CALL EXPERIENCE – TUSM

- Objectives for the “Night on Call” experience:
  1. To provide a realistic “Night on Call” practice experience.
  2. To gain experience with the types of clinical encounters that one may face as an intern.
  3. To review basic skills that one may be called upon to perform as an intern.

- Logistics:
  - All students (n-135) attended a 30 minute lecture prior to the experience highlighting goals and objectives along with student roles and expectations.
  - The “Night on Call” experience was 2.5 hours in length and was completed over 4 afternoons.
  - Students reported to their assigned session in groups of 12, they were then divided into
groups of 3 students.

✓ The “Night on Call” experience:
  ✓ Students receive a verbal and written sign-out from a senior resident (EM or IM resident) highlighting the “Night on Call” cases.
  ✓ Students worked in groups of 3 and were brought to the individual stations by proctors.
  ✓ Stations were set up as follows:
    ✓ High fidelity simulation (HFS) – Case 1: Chest pain / shortness of breath with severely elevated blood pressure.
    ✓ HFS – Case 2: COPD / worsening shortness of breath leading to PEA arrest.
    ✓ Standardized patient (SP) case – (For this station, the group of 3 students were separated to allow each student to evaluate an SP independently). We developed
    ✓ 3 SP cases: Chest pain (acute coronary syndrome), altered mental status (hypoglycemia) and fever (sepsis).
  ✓ Procedural station – Students were expected to perform IV access and phlebotomy using task trainers.
  ✓ For the HFS and SP cases, students were able to consult a senior resident (phone consultation). The senior resident (EM or IM resident) would provide phone advice on an as needed basis when called. For the COPD / PEA case, the senior resident would respond to the bedside and “Run” the code.
  ✓ After the students completed the 4 station exercise, they underwent a 30 minute debriefing.

Medical Student Perceptions of an End of Fourth Year Clinical Skills Program.


✓ 2 hour program / 3 stations
✓ Code scenarios
  ✓ VT/VF
  ✓ PEA
  ✓ Asystole
✓ Arrhythmias
  ✓ Unstable VT
  ✓ AF RVR
  ✓ Stable SVT
  ✓ Unstable CHB
✓ Skills station
  ✓ ABG sampling
  ✓ IV access
  ✓ NGT insertion
  ✓ Phlebotomy
  ✓ Suturing

The students reported feeling better prepared for managing selected cardiovascular emergencies after the completion of the program than they did prior to the session.

Julianna Jung, MD, FACEP - Johns Hopkins University School of Medicine

Curriculum Design:

- Follow a structured approach to curriculum design, such as the Kem’s Six-Step method.¹
- Involve all major stakeholders, including students, graduates, current interns/residents, medical school faculty, residency program directors
- Look beyond medical knowledge and patient care objectives in order to address the diverse and complex issues faced by interns

CORD Academic Assembly
Denver, CO
March 6th-8th, 2013
Needs Assessment:
- Curriculum should be based on what interns need to know in order to be safe, effective, and happy come July!
- Survey stakeholders to identify gaps in existing curriculum and key areas for review and reinforcement during the capstone course.
- Topics often covered in capstone courses:
  - Patient Care and Medical Knowledge:
    - Common nonemergent clinical issues: wound care, hypertension, glucose management, approach to lab abnormalities, pain management, ocular complaints, rashes, pain management.
    - Procedural skills: BLS/ACLS, airway management, peripheral/central vascular access, ultrasound, lumbar puncture, suturing/knot tying, chest tube insertion, surgical skills
    - Clinical data interpretation: physical exam, abnormal labs, radiology, EKG
  - Communication and Professionalism:
    - Doctor-patient communication: breaking bad news, error disclosure, difficult patients
    - Interprofessional communication: effective teamwork, crisis resource management, handling interpersonal challenges within the care team, medical documentation
    - Medicolegal and ethical issues: neglect/abuse, code status/DNR, end of life and palliative care, informed consent, respecting autonomy, conflict of interest, medical error, responsible prescribing, discharge planning
    - Residents as teachers
    - Self care: depression/burnout, work-life balance, sleep, financial planning, licensing process
  - Systems-Based Practice and Practice-Based Learning/Improvement
    - Medical economics: healthcare reform, insurance
    - Patient safety: falls, aggressive patients and use of restraints, impaired physicians, triaging patient acuity, medical errors
- Goals & Objectives:
  - Develop clear overall course goals – what need is your course filling? What should your students be able to do after completing your course?
  - Big-picture goals to consider:
    - Improve intern quality of life and reduce stress
      - Enhance intern confidence, particularly about anxiety-provoking topics
      - Promote effective self-care
    - Increase patient safety and quality of care
      - Improve medical knowledge and clinical skills
      - Improve communication and teamwork skills
      - Improve understanding of patient safety
      - Improve preparedness to handle ethical dilemmas
- Instructional Methods:
  - Focus on immersive learning: all courses surveyed use some form of simulation and/or skills lab, and most used it as the primary instructional method.
Focus on real clinical problems: for non simulation-based sessions, most courses use problem-based learning or case discussion formats to ensure relevance of content to real-life problems faced by interns.

Avoid traditional didactics: no course surveyed relied on lecture as an instructional method, and the objectives of these courses would not be achieved through lectures.

Think outside the box: many capstones use innovative hybrid simulations, interactive “skills labs” for communication and documentation, integrated instruction where classroom sessions dovetail into simulations or patient care experiences, etc. – be creative!

Cater to the varying needs of students entering different specialties: most courses offer some form of specialty “track” – EM was often combined with surgery or anesthesiaology, though this varies between institutions

Provide needed certifications: many courses offered BLS, ACLS, PALS, or ATLS – in addition to teaching needed skills, this gives interns one less thing to worry about during their credentialing process

Implementation:

- Capstones are resource-intensive: experiential learning isn’t cheap, and these courses require many hours of faculty time for curriculum development and implementation. Secure the support you need!
- Involve multidisciplinary faculty: most capstones include diverse content that is best divided between faculty in multiple specialties.
- Involve residents: they know best what intern/resident life is really all about, and will offer a dimension that faculty simply can’t bring to your course.

Evaluation & Assessment:

- Rigorous outcome measures are often a weakness of capstone courses.
  - Assessment (particularly practical skills-based assessment) takes teaching time away from already brief courses, and is resource-intensive.
  - Should flow from objectives – if your goal is reduction of intern stress, then a simple survey may be an adequate measure. If you want to actually improve skills, think about skills-based testing if feasible.

- Published courses show excellent student satisfaction and improved self-confidence.² ⁴ ³
- Some courses have shown gains in technical skills for course participants relative to nonparticipating peers,⁵ ⁷ though many of these relative gains deteriorated over internship.⁶ ⁷
- Consider surveying graduates after they have started internship, as well as residency program directors to learn more about the effects of the capstone once internship has actually begun

References:


Megan Fix, MD
University of Utah

**So you want to start a Capstone course?**

First, ask these questions:
- Elective vs required?
- Specialty vs entire class?
  - Consider different content for different “tracks”
- Targeting internship vs specialty?
  - Anesthesia, Dermatology, Radiology, etc.
- Informational vs assessed
  - Will you have grades?

Then start to determine the structure:
- Attendance Policy
- Length
- Curriculum
- Leadership of the program
- Dividing students
- Faculty participation

Then negotiate for resources and funding:
- If required then school of medicine should have funding
- Determine if your school has a central way to handle OSCEs, SPs, SIM and if you need to “rent” time there
- Determine if your school/department has a way to compensate faculty time
- Negotiate funding for the leaders of the program
- Negotiate for a coordinator/administrator
- Negotiate for other “carrots” like titles, letters to Chairperson
- Utilize your schools learning management system (ie blackboard, Canvas) and consider asynchronous options

Build an awesome program
- Meet with faculty early
- Nail down dates early
- Involve residents as teachers
- Consider googledocs or a shared calendar
- Write a syllabus, goals and objectives, assignment/reading list, and attendance policy and send to students early
- Consider checklists

**Brief Description of Emory University School of Medicine Capstone Course**

**Sheryl Heron MD, MPH, Jason Liebzeit, MD**

**Background:** The Emory School of Medicine Capstone Course is a month long course beginning in April of the senior year (after the NRMP Match). This stand-alone curriculum is designed to be the
culmination of undergraduate education for the Emory University School of Medicine (EUSOM) curriculum. The intended participants are students who are in the last month of their medical education and who are anticipated to begin residency training in July. In its second iteration, integration of Selectives in the curriculum was specialty-specific which allowed students to tailor their schedule according to their matched residency positions. The 4 themes for the month long course are “How to be a Good Doctor”, How to Communicate Effectively, Navigating Systems: Systems Based Practice and Professional & Personal well-being

**Description:** The core content of Capstone was condensed from Mondays to Fridays to Tuesdays, Wednesdays and Thursdays. Mandatory Modules objectives of the Capstone course are to: Prepare students for a smooth transition to their PGY-1 year; Demonstrate professionalism as it relates to patient care and collaboration/team-building skills; and assess and enhance teaching skills including: lecture presentations. A new Selective curriculum was developed which focused on medical humanities and specialty-specific content of particular interest to the learners. The Selectives are offered on Mondays and Fridays in the morning or afternoon. The Selective template was created which included name of the Selective, specialty - focus (intended audience) and learning objectives. The curriculum is interactive and utilized lectures, simulation-based skills labs, standardized patient encounters, independent readings, reflective writing and small group discussions with students’ Society Advisors. A Capstone Course director and Co-Director worked with a dedicated team including students, residents and faculty to engage discussion on how to design and develop the specific content and format for the Capstone.

**Significance:**
There were 125 participants in the Capstone course in 2012. There were 19 Selectives that were tailored to different specialties with many of the Selectives applicable to students going into a variety of specialties. The overall evaluation and inclusion of the Selectives were positive with students on average rating each selective at 85% or higher in the evaluations. Of note, the Selectives appealed to students matched in varying specialties, which allowed for interdisciplinary learning. Specifically, in the evaluations of the Ultrasound Guided Procedures Selective, students matched in Emergency Medicine, Radiology, Pediatrics and others. Of the 53 individuals (largest cohort) who signed up for the Selective, 97% agreed they would recommend the Selective to their peers. In the Selective with a smaller number of participants (the Advanced Clinical Skill Neonatal and Neurological Evaluation of Children), of the 9 individuals who evaluated this Selective, 88% agreed they would be able to better provide a thorough, appropriate newborn assessment. The capacity for interspecialty training is particularly novel and sets the stage for students matched in different specialties to work more closely together as residents when they begin their training. As we approach the implementation of the Next Accreditation System, there is an opportunity for Selectives to embed Level 1 milestones of what is expected of a graduating medical student.
The Capstone Course - Who, What, Where?

Megan Fix, MD
Seryl Heron, MD, MPH
Jules Jung, MD
David A. Wald, DO

2013 CORD Academic Assembly
Denver, CO

Capstone - Agenda

- Brief survey results - CDEM listserv
- Night on Call experience - TUSM
- Best practices / highlights - JHMS
- Logistics / challenges - UUMS
- Highlights - EUSM
- Q&A

Capstone Programs - Brief Survey

<table>
<thead>
<tr>
<th>Year of 1st Course</th>
<th>Length of Course</th>
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“Night on Call” Experience

Objectives:
- To provide a realistic “Night on Call” practice experience
- To gain experience with the types of clinical encounters that one may face as an intern
- To review basic skills that one may be called upon to perform as an intern

2.5 hours in length
- 12 students / session (total 135 students)
  - Students worked in groups of 3 (four groups)
- Students received an verbal and written sign-out from a senior resident (EM or IM)
- 4 station format
- Consult / phone advice available from a senior resident
- Post exercise debriefing

HFS - Station 1: CP/SOB with ↑BP
HFS - Station 2: COPD/SOB...PEA
SP Station: 3 cases
  - Each student to evaluate an SP case independently
  - CP (ACS)
  - AMS (hypoglycemia)
  - Fever (sepsis)
  - Procedural station - IV access and phlebotomy
“Night on Call” Experience

Achieved Objectives

Valuable Experience

- Achieved objectives and was a valuable experience
- Group size and format was well received
- Station length and length of the overall experience was appropriate
- The HFS and SP cases offered a realistic experience
Capstone – Clinical Skills 2009

- 2 hour program
- 3 stations
- Code scenarios
  - VT/VF
  - PEA
  - Asystole
  - Arrhythmias
  - Unstable VT
  - AF RVR
  - Stable SVT
  - Unstable CHB

Skills station
- ABG sampling
- IV access
- NGT insertion
- Phlebotomy
- Suturing

Capstone – Clinical Skills 2009

<table>
<thead>
<tr>
<th>Code Scenario</th>
<th>Before Program (VP - SP)</th>
<th>After Program (VP - SP)</th>
<th>P-Value</th>
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<tr>
<td>Pulseless VT/VF</td>
<td>51%</td>
<td>94%</td>
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<tr>
<td>PEA</td>
<td>43%</td>
<td>92%</td>
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<tr>
<td>Asystole</td>
<td>48%</td>
<td>94%</td>
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<tr>
<td>Arrhythmia Management</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Unstable VT</td>
<td>54%</td>
<td>95%</td>
<td>&lt;0.0001</td>
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<tr>
<td>AF Rapid Ventricular Response</td>
<td>53%</td>
<td>95%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Stable SVT</td>
<td>49%</td>
<td>95%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Unstable CHB</td>
<td>46%</td>
<td>94%</td>
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Best Practices

Jules Jung, MD
Department of Emergency Medicine
Johns Hopkins School of Medicine
Rigorous Curriculum Development Process

Kern’s Six-Step Method:
- General needs assessment
- Targeted needs assessment
- Goals & objectives
- Instructional methods
- Implementation
- Evaluation and outcomes

Needs Assessment

What do interns need to know...
- To be really impressive in the eyes of their peers and superiors?
- To provide safe and high-quality patient care, with optimal outcomes?
- To minimize their own stress and anxiety?
- From this, derive content for curriculum

Patient Care/Medical Knowledge

In-hospital emergencies:
- Shock/hemorrhage
- Acute dyspnea
- Altered mental status/coma
- Acute chest pain/MI
- Arrhythmia
- Anaphylaxis/allergy
- Fever/sepsis
- Acute abdominal pain
Patient Care/Medical Knowledge

- Non-emergent conditions, particularly those not covered elsewhere - ophtho, derm, etc
- Procedural skills
- Data interpretation

Communication/Professionalism

- Doctor-patient communication
  - Breaking bad news
  - Error disclosure
  - Difficult patients
- Interprofessional communication
  - Teamwork and crisis resource management
  - Challenging team interactions
  - Documentation

Communication/Professionalism

- Medicolegal and ethical issues
  - Neglect/abuse
  - End of life care, code status/DNR
  - Informed consent
  - Conflict of interest
  - Medical error
- Residents as teachers
- Self-care topics
### Systems-Based Practice/PBLI

- Patient safety
  - Falls
  - Medical error
  - Restraint use
  - Impaired physicians
  - Assessing acuity
- Health reform/medical economics

### Goals & Objectives

- Some big-picture goals:
  - Improve intern quality of life
  - Improve patient care safety/quality
  - From these, derive "SMART" objectives
  - Specific, measurable, attainable, relevant, timely
  - Ask “Who will do how much of what by when?”

### Instructional Methods

- Immersive, interactive, experiential
  - High or low fidelity simulation
  - Part task trainers
  - Standardized patients
  - Small group discussion
- Clinically relevant
  - Problem-based learning
  - Case-based discussion
Instructional Methods

- Offer choices
  - Specialty “tracks” to tailor curriculum to students' varying needs
  - Selectives based on areas of interest
  - Beware of too much choice – students don’t know what they need to know!
- Consider certification courses (BLS, ACLS, ATLS, PALS, etc)

Implementation

- Secure needed resources
  - Assess this realistically
  - Capstones are resource-intensive
  - Involve multidisciplinary faculty
    - Too much breadth for one specialty
    - Set example of interdisciplinary collaboration
    - Opportunity for interprofessional education
  - Involve residents – they are true experts on what interns need to know!
Evaluation & Assessment

- Should be driven by G&O - can you prove that you taught what you set out to teach?
- Hierarchy of educational evidence
  - T0: Did they like it?
  - T1: Did they perform better in the sim lab?
  - T2: Did they perform better at the bedside?
  - T3: Did they improve patient outcomes?

Evaluation & Assessment

- Often not a focus of Capstones
- **Pros:**
  - Measures of curricular effectiveness
  - Useful for refining and improving curriculum
- **Cons:**
  - Testing (particularly practical skills testing) takes time away from teaching
  - Not fun (for anyone)

Evaluation/Academic Options

- Course evaluations
- Post-hoc surveys of grads
- Post-hoc surveys of program directors
- Written tests
- Skills-based tests in sim lab
- Structured clinical observations
- Others.......?
Evaluation & Assessment

- Very little literature about educational outcomes from Capstone courses
- High student satisfaction reported
- A few studies show improved sim lab performance, especially for technical skills
- These gains appear to deteriorate over internship

Summary of Best Practices

- Focus on what interns really need to know, and fill gaps in your existing curriculum
- Set measurable objectives
- Use powerful educational methods
- Make sure you get the help and resources you need to be successful
- Don’t neglect assessment

You want to start a Capstone course?

Megan Fix, MD
Associate Program Director, EM Residency
Director, Acute Care Track
University of Utah School of Medicine
University of Utah

- 4 “Tracks”
  - Applied Anatomy
  - Primary Care
  - Acute Care
  - EM
  - Anesthesia
  - Medical Sciences
- 2 Courses
  - Longitudinal Course
  - Transitions Course

“Transition to Internship” Course

- 4 weeks in April
- 8-5 M-F
- Mornings – whole group class content
- Afternoons – break up into tracks: procedures, simulation, small group work

Novel Ideas in our Course

- In addition to sim, task trainers, ACLS, OSCEs, ultrasound:
  - Students as teachers
  - Book club
  - Partnering with other departments (ie Anesthesia)
  - Interprofessional Education (IPE) with other students (ie nursing, dental, PT)
  - Scavenger hunts
  - Group presentations
  - EBM competition
  - Chief resident panel
Starting a Course - Questions to Ask

- Elective vs required
- Specialty vs entire class
  - Consider different content for different tracks
- Targeting internship vs specialty
  - Anesthesia, Derm, Radiology, etc
- Informational vs assessed
  - Will you have grades?

Determine Structure

- Attendance Policy
- Length of course
- Curriculum and content
- Leadership of the program
- Dividing students
- Faculty participation

Negotiate Resources/Funding

- If required then school of medicine should have funding
- Determine if your school has a central way to handle OSCEs, SPs, SIM and if you need to “rent” time there
- Determine if your school has a way to compensate individual faculty time
Negotiate Resources/Funding

- Negotiate funding for the leaders of the program
- Negotiate for a coordinator/administrator
- Negotiate for other “carrots” like titles, letters to Chairperson, funds, time off
- Utilize your school’s learning management software (ie. Blackboard, Canvas)

Build an Awesome Program!

- Meet with faculty early
- Nail down dates early
- Involve residents
- Consider google docs or a shared calendar
- Write a syllabus, goals and objectives, assignment/reading list, and attendance policy and send to students early
- Consider checklists

Looking Back...

- 4th year students who have matched and are burned out
  - Try to make content completely applicable to them and helpful
  - Minimize lecture time
  - Have fun!
Acknowledgements

- **Tamiko Burgess**
  - Course Administrator

- 183 Faculty & Resident teachers

- **Dr. Kate Heilpern**

Background

- Post-Match
- Enhanced Preparation for post-graduate work/life after medical school
- Revised Curriculum
  - Increased specialty-specific content
  - Increased schedule flexibility
Capstone 2013

- April 8 - May 3
  - Mandatory modules Tuesday, Wednesday, Thursday

- Selectives Monday & Friday

4 Themes

- How to Be a Good Doctor
- Communicating Effectively
- Navigating Systems
- Professional & Personal Well-being
Mandatory Modules (15)
- Intro to GME
- On Call Emergencies
- Systems
- Resident Pearls Panel
- Quality & Safety
- Handoffs
- Team Training
- Palliative Care
- Pharmacy
- MSCLE
- Mandated Reporting
- Health Disparities & Civil Rights Law
- Resident as Teacher
- Impaired Physicians
- Professional & Personal Wellbeing

Selectives (19)
- Ultrasound-guided procedures
- Advanced EBM
- Death investigation & certification
- Surviving Surgical Internship
- Reflective Writing
- History of Medicine
- Radiology: CT search patterns
- Injury prevention
- Palliative Care
- Business of Medicine
- Advanced Clinical Skills
  - Adult
  - Pediatric
- Blood banking
- Financial Literacy
- Acute wound care
- Ethics & Residency
- Optimizing Recovery of Bugs
- SimWars

Opportunities
- Increase Selective offerings
  - Marketing
- Refine existing Modules & Selectives
  - Next Accreditation System (NAS) & Milestones
- Scholarship
  - AAMC
  - ACGME
  - Education journals
  - Specialty journals
Selective Recruitment

- All welcome but specific needs:
  - Surgical Specialties
  - Pediatrics
  - Outpatient Care
  - Psychiatry

- Other suggestions
  - Leadership (Chair's/PD panel)
  - History of Grady
  - Health Policy
  - Medicolegal

Questions