



Preliminary Report of the Basic Sciences **Working Group Regarding Curriculum Revision**

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Vision Statement for the Basic Sciences Curriculum

“The medical school curriculum for the first two years will provide students the scientific foundation that they need to be outstanding physicians, leaders in the medical community and innovators in the medical and biomedical sciences.

The students will be prepared to critically analyze clinical and scientific publications that relate to their professional focus and will develop the skills to continually learn as medical science advances.”



Charge 1. Review the current structure and methods for imparting and assessing basic science knowledge

- The current curriculum is scientifically intensive and rigorous BUT sub-optimal (Education Retreat, 2007)
- We reviewed the pros and cons of the current curriculum of years 1-2 and reached consensus on its shortcomings
- For ideas to remedy the shortcomings, we reviewed the curricula of several top medical schools that had revamped their preclinical courses
- We made recommendations for improving the curriculum that mesh well with UCSD's inherent strength in science



The Present Basic Science Curriculum: Shortcomings

- Insufficient integration across disciplines/courses
- Undue emphasis on minutiae such that core concepts are unclear, not consistently well linked to learning objectives
- Insufficient connection to clinical relevance/training
- Teaching and assessment are overly dependent on lectures, passive learning, and memorization



Charge 2. Make recommendations for change at UCSD regarding optimal course structure and teaching methods to transmit these competencies

- The Working Group reached consensus on recommendations for improving teaching methods, educational environment, and curriculum oversight
- We endorsed several educational principles that should inform curriculum changes
- Finally, we recommend a "structure" for a new curriculum that should guide the development of new courses



Educational Principles-Recommendations

- Increase clinical education in years 1-2

(The PreClerkship Working Group's recommended "Practice of Medicine" curriculum would also address this)

- Increase basic science education in years 3-4

(e.g., basic science review modules in the later years. Also, elective modules in years 3-4 for self-selected students seeking "high intensity basic science medical training.")



Educational Principles-Recommendations

- Provide more curriculum flexibility, increasing options for our students who will pursue a variety of career goals, e.g., general practice, biomedical science, education.
- Emphasize the core basic science concepts that are essential knowledge for the practice of clinical medicine.



Teaching-Recommendations

- Decrease the amount of lecture-based teaching significantly, e.g., by 50%.
- Increase active learning by students (self- and small group-based education; research activities).
- Provide more exercises that develop critical thinking skills.
- Provide web-based learning tools where appropriate.
- Teach basic science in a manner that makes it clinically relevant.



Teaching-Recommendations (cont.)

- Emphasize core concepts to provide an essential framework for deeper study; avoid attention to minutia.
- Ensure that teaching, across all courses, is of high quality, is clear in its linkage to important learning objectives, and consistent in its expectations of students.
- Provide resources and educational exercises that enable student-directed learning, both independent and collaborative.
- Provide educational exercises that engender students' professionalism and skills of self-reflection and life-long learning



Educational Environment-Recommendations

- Compensate teaching faculty appropriately, including by the promotion process.
- Engage a wider range and number of faculty in small group teaching.
(An option, that also promotes active learning, would be to engage senior medical students, residents and fellows in small group teaching.)
(Small group leaders, whether faculty, residents, fellows or students, will need training.)
- Partner basic science and clinical faculty in core course teaching.



Educational Environment-Recommendations

- Switch to pass/fail grading (eliminate honors for years 1-2).
- Improve the consistency between courses in terms of teaching style, the nature of the educational exercises, and quality.
- Increase emphasis on the clinical context in basic science courses



Curriculum Oversight-Recommendations

- Ensure that a committee (e.g., the CCC) is knowledgeable about the content of each course, and its particular responsibility for the learning objectives of the entire curriculum.
- Continuously monitor, adjust, and improve the curriculum



Proposed Structure of a New Basic Science Curriculum

- *The Working Group recommends establishing a primarily interdisciplinary "System/Organ-Based" curriculum.*
- From the beginning of year 1, the coursework would parallel and connect with the pre-clerkship, "longitudinal doctoring curriculum"
- In addition to "Organ-focused" blocks, some material would more appropriately be taught as "Themes"
- To optimize learning, material would be presented initially at an "introductory" level of complexity, e.g., in one or more "prologues", then reinforced later in the curriculum with more advanced coverage



An Organ-Based Curriculum for UCSD (for illustration purposes) OVERVIEW

- **Prologue.** Occurs early, interdisciplinary, introduces key concepts, essential for the later courses.
(e.g., introduce principles of cell biology, histology, anatomy. Dissection of the body cavities early on could establish a foundation for the anatomy of the physical exam; the organs would be available for later block study.)
- **Major Organ System Blocks.** Interdisciplinary, e.g., Cardiovascular, Pulmonary, Renal, Gastrointestinal, Musculoskeletal, etc.
(Coverage would be of structure and function, from molecules to tissues to the organism, physiology and pharmacology, both normal and pathological.)
- **Theme Blocks.** These would cover material that does not fit well into organ blocks.
(e.g., Growth and Development (embryology, cellular signalling in development, genetics, reproductive medicine); Cancer; Infection, Immunology Infection; Also, interdisciplinary themes, could be oriented toward common important diseases: e.g., cardiovascular disease, cancer, and diabetes/metabolic disorders.)



An Organ-Based Curriculum for UCSD (for illustration purposes) *An Example*

Current UCSD Curriculum

Year 1 – Basic Science

Cell Biology and Biochem
Pharmacology
Physiology
Basic Neurology
Endocrine –Repro and Metab
Social and Behavioral Sci

Year 2 – Basic Science

Hematology
Histology
Epidemiol and Biostats
Anatomy
Pathology
Laboratory Medicine
Social and Behav Sci

A Proposed Curriculum, Example

Year 1 – Basic Science

Prologue: Intro to principles-Cell Bio/Biochem, Pharm, Histol, Anat, Radiol
Organ Systems I: Cardio, Pulmon, Renal
Organ Systems II: GI, Nutrition, ERM,
Musculoskeletal Syst: Orthoped, Medicine, Pathogenesis of arthritis, lupus, etc
The Body has a Head: Neurol, Anat

Year 2 – Basic Science

The Life Cycle: Embryol, molec signalling in Devel., genetics, growth-aging
Hematology/Oncology
Infection, Immunology, Inflammation
Microbiology
Epidemiology and Biostatistics
Epilogue: Highlight, integrate, more deeply Re-visit earlier basic science topics with a Clinical focus, e.g., diabetes, atherosclerosis, Coronary disease; “bench to bedside”

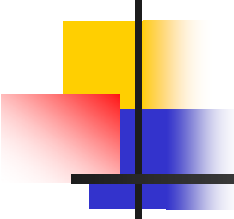


An Option for Further Consideration

- Establish a science-intensive MD “track” similar to the Health Sciences and Technology (HST) option at Harvard/MIT
- This would further identify UCSD as a medical school with strength in the training of physician-scientists; it could leverage off the current MSTP

Further study of this option should address:

- 1) How a science-intensive track might attract students who otherwise would choose other schools over UCSD
- 2) Whether such a track would be compatible with existing non-Ph.D. dual-degree programs (e.g., M.S., M.P.H)
- 3) Whether sufficient resources will be available to launch such a track *and* support curriculum reform generally



Charge 3. Delineate the core basic science concepts that are essential knowledge for the practice of clinical medicine

And

Charge 4. Define research methodologies (basic science, epidemiology, clinical and translational) that are critical for students to understand in order to properly interpret the medical literature, both basic and clinical

- Future work will be needed to design the block courses, and make careful choices about their content. UCSD would, if following the model of other top medical schools, need to formulate and establish a list of core concepts/learning objectives and key research methodologies our students need to learn.



A Caveat

- The Working Group was in good agreement on philosophical matters, and there was enthusiasm for curriculum improvements.
- But, curriculum change will need buy-in from the faculty who, in our culture of a diffuse power structure, have limited teaching responsibilities in comparison to their research and service responsibilities. Most faculty pay themselves from research or clinical revenues and have not been tangibly rewarded to teach.
- Teaching that is currently done depends on a dedicated subset of faculty in an educational system that is held together by a large amount of good will and not much money. These core faculty, understandably, have a sense of pride and ownership of courses in our current structure.
- Therefore, the benefits of curricular change must be compelling.
 - For faculty: exciting, new collegial interactions; pride in our educational mission.
 - For students: improved learning, performance and satisfaction.

IN SUMMARY



The Basic Science Working Group's Recommendations

- Increase clinical education in years 1-2
- Keep science undiluted, increase emphasis on scientific principles, including in years 3-4
- Revamp the curriculum to increase integration between disciplines
- Reduce lecture time, emphasize concepts
- Increase time and resources for independent, collaborative learning
- Develop exercises to better foster critical thinking