Case Western Reserve University – University Program Medical School

Block 2: Action Plan 2019-2020

Year 1 (July – May)

Becoming A Doctor	2 Weeks Steps2Succes	The Human Blueprint	Food to Fuel	Homeostasis
Block 1 (5 Weeks)		Block 2 (11 Weeks)	Block 3 (9 Weeks)	Block 4 (14 Weeks)
Population Health, Epidemiology, Biostatistics, Health Disparities		Endocrinology, Reproduction, Development, Genetics, Molecular Biology, Cancer Biology	Gastroenterology, Nutrition, Biochemistry	Cardiovascular, Pulmonary, Renal, Cell Physiology and Pharmacology
Field Experiences Assessment Week		Integrative Week Assessment Week	Assessment Week	Clinical Immersion Week Assessment Week
Structure (Anatomy, Radiology and Histopathology) Foundations of Clinical Medicine (Tuesday Seminars, Communications, Physical Diagnosis, Patient Based Experiences)				

1. Course Description:

Block 2 tells the story of cellular, tissue and organismal development in the context of the replication, transmission, and differential expression of the 'human blueprint,' i.e. the genome. This block incorporates basic and clinical concepts from seven different disciplines: Molecular Biology, Cell Physiology, Genetics, Development, Endocrinology, Reproduction, and Cancer Biology. Four overarching themes, Inheritance, Development, Regulation and Mis-regulation, underlie much of the block content, integrating the seven disciplines and providing a conceptual framework for understanding the basic molecular and cellular mechanisms that underlie health and disease.

2. Block Co-Leaders:

- Jo Ann Wise, Ph.D. (Molecular Biology)
- Joseph Bokar, M.D., Ph.D. (Cancer Biology)
- Nivo Hanson (Block manager)

3. **Design Team:**

- Ron Conlon, Ph.D. (Development)
- George Dubyak, Ph.D. (Cell Biology)
- Sherif El-Nashar, M.D. (Reproductive Biology)
- Jonatha Gott, Ph.D. (Molecular Biology)
- Smitha Krishnamurthi, M.D. (Cancer Biology)
- James Liu, M.D. (Reproductive Biology)
- Marcia Michie, Ph.D. (Bioethics)
- Aditi Parikh, M.D. (Genetics)
- Laure Sayyed Kassem, M.D. (Endocrinology)

4. **Block Objectives:** Please fill in the table below for your Block Objectives.

Competency and Definition	Educational Program Objective (EPO)	Block Goals Block 2	Recommended Changes
Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences as well as the application of this knowledge to patient care	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician	Understand and apply their knowledge of the patterns of inheritance.	Modify the order and, to a lesser extent, the content, of a subset of the Genetics lectures (see below for specifics). Make major changes to one of the application exercises in TBL#2 and minor changes to another.
Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences as well as the application of this knowledge to patient care	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician	Describe the flow of genetic information from gene to phenotype.	Replace the relevant Molecular Biology lecture with an interactive session utilizing Poll Everywhere. Reorganize the Molecular Biology TBL Prep lectures and make minor changes to the content.

Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences as well as the application of this knowledge to patient care	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician	Apply their knowledge of the physiology of reproduction and development.	Make any other changes deemed appropriate in response to student feedback.
Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences as well as the application of this knowledge to patient care	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician	Apply their knowledge of hormone synthesis, targets, action, and regulation. Describe cell cycle control. Outline the principles and pathways of signal transduction.	No changes recommended. Integrate with DNA replication/repair lecture and juxtapose with the Cancer Biology module. No changes recommended.
Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences as well as the application of this knowledge to patient care	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician	Describe the fundamentals of cancer. Explain how dysregulation can lead to disease. Describe how this knowledge can be used to determine treatment options.	Recruit one or more new lecturers to replace Joe Bokar. Replace the current Molecular Biology lecture with an interactive session. Replace the Cancer TBL with an interactive lecture.
Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic	Apply their knowledge of methods of clinically testing of DNA and genes to solve hypothetical problems.	Add a lecture on high throughput sequencing (HTS) and update the lecture on molecular diagnostics (belated response to a suggestion in the PEAC report).

sciences as well as the application of this knowledge to patient care	science knowledge to be an effective starting resident physician		
Common to all Blocks:			
Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences as well as the application of this knowledge to patient care	Demonstrates ability to apply knowledge base to clinical and research questions Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician	Recognize and analyze ethical problems in clinical medicine and biomedical research using the principles of autonomy, beneficence, nonmaleficence and justice.	Move one of the early Bioethics lectures to a later point in the block, after the students have been exposed to the relevant basic science content. Explore the possibility of reorganizing the Block 8 content with the same goal.
Teamwork & Interprofessional Collaboration Demonstrates knowledge and skills to promote effective teamwork and collaboration with health care professionals across a variety of settings	Performs effectively as a member of a team	Develop and practice the knowledge and skills that promote effective teamwork across a variety of settings.	Further modify the two remaining TBL sessions to accommodate the larger rooms/groups in the HEC. Consider having one facilitator move between rooms to ensure uniform delivery of content.
Professionalism Demonstrates commitment to high standards of ethical, respectful, compassionate, reliable and responsible behaviors in all settings, and recognizes and addresses lapses in behavior	Commonly demonstrates compassion, respect, honesty and ethical practices Meets obligations in a reliable and timely manner Recognizes and addresses lapses in behavior	Understand and practice the behaviors of an ethical, respectful, compassionate, reliable, and responsible physician.	No changes recommended.

Interpersonal & Communication Skills Demonstrates effective listening, written and oral communication skills with patients, peers, faculty and other health care professionals in the classroom, research and patient care settings	Uses effective written and oral communication in clinical, research, and classroom settings Demonstrates effective communication with patients using a patient-centered approach Effectively communicates knowledge as well as uncertainties	Understand and demonstrate effective communication skills for learning and clinical practice environments.	Continue to adapt content delivery strategies to take full advantage of options available at the HEC (see below for details).
Research & Scholarship Demonstrates knowledge and skills required to interpret, critically evaluate, and conduct research	Analyses and effectively critiques a broad range of research papers Demonstrates ability to generate a research hypothesis and formulate questions to test the hypothesis Demonstrates ability to initiate, complete and explain his/her research	Analyze, critique and present research studies from the primary literature.	Update papers used for EBIQ as deemed necessary.

5. **In the grid below, please list the specific course changes you made this year based on last year's report**.

What changes were made in 2019-2020?	**How did the changes work?**	**What would you like to change next year 2020-2021?**
Updates to inheritance lectures	The Mendelian Inheritance lecture was much improved and received higher ratings from students.	Recruit a new lecturer to cover meiosis and mitosis from a more medically oriented perspective (see below for details).

Minor changes to application exercises in TBL#2	Modifying the pedigrees in TBL#2 made the problem more straightforward for the students to solve and for the facilitators to explain.	One further minor change to one of the pedigrees to highlight consanguinity.
Sequence of Endocrinology lectures will be adjusted	The new sequence for Endocrinology was well received.	No further changes planned.
Conversion of TBL#3 to an interactive lecture format	The new format (think-pair-share) worked much better for delivering the content (Cell Signaling in Cancer).	No further changes planned.
Revisions to application exercises in TBL#4 (which became TBL#3 in 2019)	The final TBL on using microarray data to predict which cancer patients would benefit from chemotherapy was still perceived as challenging for both the students and facilitators.	The Cancer TBL will be converted to an interactive lecture format (see #8 below for details).

A change that was not anticipated last year was the switch in block leadership, with Jo Ann Wise taking over from Jonatha Gott. Discussion of this potential change began in mid-spring of 2019, well after last year's Action Report was presented, and the transition began in May. Jonatha agreed to remain on the Design Team so, in essence, there was a reciprocal exchange of hers and Jo Ann's responsibilities.

6. What changes do you anticipate making to the Block next year (AY 2020-2021)?

Aside from the changes to content and organization outlined in #4 and 5 above and #8 below, there will be another major change in Block 2 leadership for the 2020-21 academic year as described in detail under #13 below.

7. What successful, innovative components of your block that are best practices that you would like to share with the other Blocks?

We believe it would be very useful to develop and implement a formal mechanism through which more advanced students (3rd and 4th year and/or MD/PhD students in the research phase of their training) are recruited to provide feedback on block organization and content from their current perspectives. This suggestion is based on a very valuable informal discussion between the Block Leader and a current 3rd year student who was a member of her IQ group 2 years ago.

Block 2 revised its TBL feedback forms to include questions about content and recently shared the new questions with the Block 3 Leaders. We plan to look at and, if appropriate, modify the other feedback forms to ensure that we receive the specific input necessary to assess the impact of changes in content and organization and make appropriate adjustments in subsequent years.

8. What specific changes (lectures, TBL, IQ cases, other) do you plan to make to the course next year?

Changes anticipated for next year	Reason for changes (evidence)
Integrate lecture material on the cell cycle with DNA replication/repair and juxtapose this content with the Cancer Biology sections.	This change will eliminate redundancy between the Molecular Biology and Cancer Biology sections and promote student understanding of the concept of checkpoints.
TBL#3 will be converted to an interactive lecture that will employ using a think-pair-share format in conjunction with Poll Everywhere.	There are four reasons to make this change: 1) The microarray diagnostic platform is not used in the U.S. for making decisions about breast cancer treatment. In a broader context, the increasing affordability of high throughput sequencing has rendered microarrays virtually obsolete in the research arena. 2) Although TBLs in general receive the lowest ratings of any component of the Block 2 curriculum (see Appendix I), the Cancer TBL was scored lower than the other two and received more negative student comments. 3) The Cell Signaling TBL was successfully converted to an interactive lecture this year and provides a template for doing the same with the Cancer TBL. 4) From a practical perspective, the developer of this TBL is retiring and it does not seem likely that we could recruit another faculty member to further revise it.
Move the "Evolutionary Medicine" lecture to a later date.	In its current position (on Day 1), the sophisticated content is largely lost on students who lack a strong background in Genetics (especially at the population level) and Molecular Biology. The content should be juxtaposed with the Tay Sachs IQ case in which genetic bottlenecks is a key concept.
Move the "Medical Genetics and Genomics" lecture to an earlier date.	This change will highlight the importance of Inheritance as a key concept in Block 2.

Add a lecture on high throughput sequencing (HTS) and update the lecture on molecular diagnostics to include HTS and other modern testing and screening tools.	These changes will serve to highlight the "personalized medicine" theme that has been emphasized increasingly in Block 2, e.g. through TBL#1 and #2 in addition to following a suggestion in our most recent PEAC report.
Move early Bioethics lectures on reproductive ethics to a later point in the block and explore the possibility of reorganizing the Block 8 content with a similar goal in mind.	At a recent Design Team meeting, it was noted that the current schedule requires students to discuss issues surrounding decisions about reproduction before they have been exposed to the relevant basic science content.
Continue to adapt delivery strategies to take full advantage of options available at the HEC	Poll Everywhere was not yet available early in Block 2 this year but was used later in the block. One lecturer has already committed to using this interactive platform next year and, at a recent Design Team meeting, at least two other lecturers indicated that they would be interested in adapting their lectures to incorporate active learning tools. This year, several of us found the Avacor very useful in review sessions and we will encourage others to try it or another potential facsimile of a white board that is currently in the testing stage.

9. Please review your Block objectives. Have you added or deleted major concept areas to your Block?

No major concept areas were added or deleted, although the course description was modified to emphasize inheritance in addition to development, regulation and mis-regulation as an overarching thread woven through the block.

10. Describe how faculty teaching quality was reviewed for your block. What faculty development opportunity was offered in response to student feedback?

Overall, teaching evaluations were strong with 17/22 instructors rated at the middle of the block and 9/12 instructors rated at the end of the block receiving mean scores between 4.0 and 5.0. (Block 7 and 8 Instructors were excluded from these counts.) With one exception, the more poorly rated instructors served as TBL facilitators and it thus seems reasonable to postulate that the students' unenthusiastic response to the TBLs as a teaching modality (see Appendix I) might have been a contributing factor in the low ratings. Because TBL#3 is being converted to an

interactive lecture, we anticipate at least a modest increase in the scores for teaching quality next year. Other changes to the TBLs described above may promote further improvements.

Unlike last year, when one instructor gave a lecture based on slides that he had apparently not reviewed carefully, there were no unqualified disasters this year.

11. Response to PEAC Report

Here, we will focus on a global initiative being undertaken by the block leader to improve integration and eliminate redundancy between different lectures and between lectures and IQ cases. The fundamental problem seems to be the failure of some lecturers to look at slides on related topics and modify their own content appropriately. Even less attention seems to be given to ensuring that lectures provide the relevant background material for IQ cases, with the exception of lecturers who also oversee the corresponding IQ cases. "Cameo" lecturers are especially prone to approaching their own lectures as self-contained; remarkably, 23 of the 31 faculty members who lecture in Block 2 make a single appearance. To ameliorate this problem, the newly appointed block leader has begun a systematic survey of lectures on related topics and found a glaring example in short order: the cameo lecturer who covers meiosis and mitosis included slides that overlapped with three pre-existing lectures (Medical Genetics & Genomics, Traditional Patterns of Inheritance and Gametogenesis) while neglecting to cover essential background material for an IQ case (#7, Child with multiple congenital abnormalities). We are recruiting a clinical cytogeneticist who has been serving as a TBL facilitator for the past two years to replace this lecturer and will advise her on the importance of integration and continuity with other lecturers and IQ cases. The block leader will continue to review slides and inform lecturers of overlap and request changes to ensure that the concepts are being reinforced by different lecturers rather than simply reiterated. Another idea to combat the general problem of lack of coordination that emerged from our recent design team meeting is to distribute to each lecturer a simplified version of the block schedule in which different colors are used to highlight each of the seven disciplines. IQ facilitators might also benefit from receiving a simplified schedule that highlights the parallel content in lectures and IQ cases.

We would also like to note that at least one of the targeted changes described above addresses an issue that was raised in the PEAC report, namely that several lecturers referred to whole genome or whole exome sequencing but none of them explained the process or its use in modern diagnostics in sufficient detail to be useful to the students. The addition of a lecture on high throughput sequencing and other modern molecular diagnostic tools will have a direct impact on the Molecular Biology, Genetics and Cancer Biology modules and will also help to place some of the Bioethics content in an appropriate context.

12. Challenges

Block 2 will face a major challenge in the coming academic year due to the retirement of its long-time co-leader, Dr. Joseph Bokar (Cancer Biology). In addition to his leadership role, Joe

was a key lecturer and the main coordinator of the Cancer Biology module of the course. He has generously agreed to work with us in the coming months to ensure that the Cancer Biology module maintains its high standards.

We expect to finalize the decision on Joe's successor as co-leader of Block 2 soon, in consultation with Dr. Amy Wilson-Delfosse and Dr. Colleen Croniger. In addition to naming a single MD co-leader, we plan to designate section heads for the different disciplines and expand the size of the Design Team to ensure that each DT meeting will be attended by at least one representative from every discipline. In addition, we will hold sub-group meetings that focus on single or interrelated disciplines to further enhance coordination and integration across the block.

Looking to the longer-term future from the perspective of the recent past, we are acutely aware that additional Design Team members are nearing retirement age, while others have taken on responsibilities that led them to resign. In the latter category are two long-time members, Dr. Angelina Gangestad (Reproductive Biology) and Dr. Anna Mitchell (Genetics), who have been particularly difficult to replace. We will continue to seek their counsel, together with that of Dr. Bokar, as we continue to improve Block 2 content and delivery. Fortunately, Lina and Anna will continue to serve as valued lecturers in the Block.

13. Acknowledgements:

First and foremost, we want to thank **Dr. Jonatha Gott**, who stepped down as Block 2 Leader in the spring of 2019 after 6 years in the post. We are well aware that the block is in a far better state than when Jonatha was handed the reins quite suddenly during the summer of 2013.

Second, we want to express our sincere gratitude to the past and present members of our design team for their dedication to continuously improving the block content and delivery and for taking the challenges of moving to the HEC in good stride. We are also grateful to the other faculty members who contributed to the block in various ways as lecturers, IQ facilitators, TBL facilitators, etc. We hope that at least some of them will agree to join our design team in the coming year.

Third, we want to extend our heartfelt appreciation to course manager **Nivo Hanson**, who does an incredible job of shepherding us towards our goals and preventing us from veering too far off course. Nivo is always ready to help us overcome any obstacle that we might face, great or small, with a smile on her face and a kind word for anyone she encounters. She is truly instrumental in making this block a success.

Fourth, we gratefully acknowledge the considerable support received from the office of assessment, especially Dr. Klara Papp and Katie Battistone. The tremendous work done by Celinda Miller in pushing us to update our IQ cases in a timely manner and ensuring that facilitators were where they needed to be was another crucial element of Block 2's success.

Finally, we wish to thank the AV and IT technical support teams, especially Paul Salzgeber, Megan Slabach, Darren Johnson and Eric Bloss for helping to make the transition to the HEC a

little less painful. We are also grateful to Nicole Pilasky for working with us one-on-one and in pairs to facilitate incorporation of newly available software and hardware this year. We look forward to working with her in the coming year to further expand our horizons.

Appendix I

Block 2, The Human Blueprint
AY 19-20

Class of 2023 was asked questions of Block 2 components. Results are reported below as compared to results of previous three years. Responses/Expected: 42/46 (91%)

Block 2: The Human Blueprint				
General Block Aspects				
Block Components	2016-2017 %	2017-2018 %	2018-2019# %	**2019-2020#**
Approachability of faculty	77	83	72	**57**
Effectiveness of large group lecturers	62	63	56	**36**
Effectiveness of IQ cases	87	85	83	**83**
Effectiveness of team-based learning (TBL) group activities	30	35	33	**26**
Overall quality of this block	55	74	58	**29**
Block Concepts/Integration of Block Concepts and Longitudinal Themes				
Endocrinology*	81	94	91	**88**
Reproductive biology*	79	74	73	**69**
Development*	26	35	49	**36**
Genetics*	94	89	87	**81**
Molecular Biology*	57	52	59	**48**
Cancer Biology*	92	83	78	**83**
Cell Physiology*	60	52	60	**48**
Clinical & Basic Science Correlation Series*	64	63	59	**57**
GARLA	–	–	–	**60**
Histopathology	75	81	44	**64**
Bioethics	47	57	51	**64**
System and Scholarship	–	–	–	**5**

Percentage of Students who rated "Good" or "Excellent"

* "Well" or "Very Well"

#Scale changed to "Very good or Excellent" from "Good or Excellent"