

Bachelor of Science in Pharmaceutical and Medical Sciences

College of Pharmacy and Pharmaceutical Sciences

and

Elson S. Floyd College of Medicine

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A. Areas we were asked to address by Faculty Senate Leadership

1. Alignment of strategic plans

- Program is a collaborative effort between CPPS and ESFCOM.
- The undergraduate program is called out in the strategic plan of CPPS, and has direct links to the strategic plans of ESFCOM and the WSU System.

CPPS Strategic Goal 3/Obj. 5: To serve the higher educational needs of Spokane County

Strategy: Establish an undergraduate program in Pharmaceutical and Medical Sciences to:

- I. Provide a springboard for highly trained students to enter health profession schools (PharmD, MD, other) and graduate (PhD) programs;
- II. Bring new students into the WSU system to address system-wide enrollment shortfalls;
- III. Catalyze workforce development for growing biotech sector in Spokane County and across State; and
- IV. Provide a pathway for place-bound graduates of Community Colleges of Spokane (CCS) to continue their education in a public, 4-year R1 institution without leaving home

Administrative responsibility: Associate Dean for Undergraduate Programs in CPPS (Meier)

Operational Key Performance Indicators: **(1)** Approval of proposed program by Faculty Senate, Board of Regents, and NWCCU, **(2)** enrollment of our first class in Fall 2024, and **(3)** graduation and placement of our first class in Spring 2026.

Status: Awaiting Faculty Senate approval

Strong linkage of this CPPS strategic goal to:

- **ESFCOM strategic plan goals 1** (Engage communities and partners across the state) and **2** (Expand and refine degree offerings, processes and resources across academic programs), and
- **WSU strategic plan goal 2 (Student Experience)**

The proposed program is consistent with the vision statement of the WSU system:

Washington State University will deepen and expand its impact by building on the strengths of each campus and location for a stronger Washington state and global community.

2. Effect of proposed program on hiring plans of CPPS and ESFCOM

- CPPS will hire one dedicated student-success advisor, but no additional faculty.
- ESFCOM may hire a career-track faculty member at some point in the future.
- CPPS and ESFCOM will initially run the program with existing faculty, without overload.
- New costs associated with implementing/running program are minimal (one advisor).

3. Effect of proposed program on enrollments of CPPS and ESFCOM

- CPPS: We have record numbers of applicants for our PhD program, but academic pharmacy is in the midst of a nationwide downturn in applications to and enrollment in PharmD programs—enrollment is down 50% in our first-year PharmD cohort this year.
- CPPS expects the proposed undergraduate program to: (1) provide candidates for PharmD program, and (2) stabilize overall enrollment situation (PharmD + B.S. students).
- CPPS receives few applications from WSU system for the PharmD program (1-8/year out of a class of 120-140 students).
- ESFCOM intends to use the undergraduate program to enhance diversity recruiting but this program will not impact enrollment numbers in MD program, which are strong.

4. Impact of proposed program on Pullman-based programs in SMB/CVM

- This concern appears to be rooted in the belief that a B.S. program in Pharmaceutical and Medical Sciences in Spokane will cannibalize Pullman-based programs offered by SMB.
- We cannot guarantee that we will never admit a single Pullman-/SMB-based student, but such students will represent the great minority of students in the program.
- This program will have, at most, a minimal impact on pre-health sciences in Pullman.
- Objectives for creating this undergraduate program
 - ⇒ Provide a springboard for highly trained students to enter the professional and graduate programs of CPPS and ESFCOM → **benefits WSU-Spokane**
 - ⇒ Bring new students into the WSU system → **benefits WSU System**
 - ⇒ Catalyze workforce development for growing biotech sector in Spokane County and across the State → **benefits community WSU-Spokane serves**
 - ⇒ Provide a pathway for place-bound graduates of Community Colleges of Spokane (CCS) to continue their education in a public, 4-year R1 institution without leaving home → **benefits the community WSU-Spokane serves**
- Target demographic: CCS graduates with an AS degree—over 1,000 such students per year, many of whom are place-bound → **our program has a capacity of 50 students/year.**
- We have an articulation agreement with CCS, pending Faculty Senate Approval, that reserves over half of the 50 seats for CCS graduates.
- The student demographic of CCS/WSU-Spokane (commuter campuses), or any regional campus, is different from that of WSU-Pullman (residential campus), which makes relocation of undergraduate students from Pullman to Spokane unlikely.

B. Potential perception of course/programmatic duplication

- Our proposal has been approved by the Provost's office and certified to be non-duplicative, a requirement of the US Department of Education.
- Our proposal has been approved by every required sub-committee of Faculty Senate, including the Academic Affairs Committee.
- Our proposal was discussed at the FS meeting on 19 January, at which a single concern was raised by the senator from SMB; the question was addressed and there were no follow-up questions.
- We have not been informed of any specific concerns of SMB, but I have picked eight courses, out of the 18 new courses we have created for this program, and differentiated these courses from those offered by SMB (below). All SMB courses cited below are wonderful offerings that span the spectrum of molecular biosciences. Our 18 new courses do not span the spectrum of molecular biosciences but rather are entirely focused on pharmaceutical and medical sciences, and this is by design. This is one of several key differences between our proposed program and courses offered by SMB.

1. PharMedS 313 – Careers: Pathways in Biomedicine

This Writing in the Major (M) course prepares students for careers in biomedical research, pharmaceutical biotechnology, the health professions, government, patent law focusing on pharmaceutical biotechnology, and pharmaceutical/scientific journalism. Guest speakers from all areas will discuss their own careers and perspectives for future growth. Students will be evaluated by multiple, written self-reflections, exams, and participation in in-class discussions.

Potential perceived overlap: MBIOS 138—this is a seminar course, does not appear to be focused on Pharmaceutical/Medical Sciences, and is not an M course.

2. PharMedS 330 – Molecular Methods: Biomedical Techniques

This is a didactic course that prepares students for work in pharmaceutical and biotech research laboratories located in the Colleges of Pharmacy and Pharmaceutical Sciences and Medicine. The course matter covers standard techniques in molecular biology, mammalian cell culture including gene transfer techniques, principles of microscopy, and the role(s) of model laboratory animals in pharmaceutical research, including tumor xenograft models, creation of transgenic mice and gene targeting in mice by homologous recombination and CRISPR-Cas9.

Potential perceived overlap: MBIOS 304/360—these MBIOS offerings are laboratory courses (360 is also an M course), whereas we have created a didactic, survey course that has broad, descriptive coverage of laboratory techniques of importance to pharmaceutical and medical research. Students with an interest in research will be able to follow up with research rotations in the laboratories of faculty members in CPPS or ESFCOM.

3. TMP 350 – Introduction to Medical Biochemistry

This introductory course examines the role of altered biochemical function in human disease processes, laying the foundation for follow-on courses that focus on the pathophysiology and pharmacotherapy of these diseases. The course is divided into four sections (proteins, nucleic acid, lipids, metabolism), each of which culminates in a capstone lecture on the roles of these biomolecules in human pathophysiology. The course ends with an extended discussion of the

role of altered metabolism in the etiology and treatment of diabetes mellitus, linking basic errors in biochemical processes with treatment of human disease.

Potential perceived overlap: MBIOS 303/405/413/414—there is no obvious focus on human disease, pathophysiology, or pharmacotherapy in any of these MBIOS courses, with the exception of 405, which discusses scientific literature related to human disease. Our didactic course was specifically designed to link disruptions in biochemical function to pathophysiology and pharmacotherapy of human disease.

4. PharMedS 401 – Genomics: Frontiers in Human Genetics

This course is almost entirely focused on pharmacogenomics—personalized or precision medicine, the concept that an individual's genetic make-up both determines susceptibility to disease and guides pharmacotherapy of that disease. The first third of the course provides the students with a general background on genomic organization, DNA replication, and recombination. The focus of the latter two thirds of the course is on precision medicine, including linkage analysis of nucleotide polymorphisms, and gene deletions/insertions to human disease and pharmacotherapy. Our course also covers ethical aspects of pharmacogenomic science.

Potential perceived overlap: MBIOS 423/503—our course focuses extensively on pharmacogenomics; coverage of that topic is not apparent in MBIOS 423 or 503. Pharmacogenomics has become a core discipline in pharmaceutical sciences over the past 25 years and continues to grow in importance. Pharmacogenomic principles will likely guide pharmacotherapy of all diseases that have an underlying genetic basis. Similarly, patient responses to pharmacotherapy are also dictated by patient-specific genetic factors. For example, CYP2D6 is the human enzyme that converts codeine, an opioid analgesic agent, into its active metabolite, morphine. Patients with loss-of-function mutations in CYP2D6 do not derive analgesic benefit from codeine to the same extent as patients without these mutations because they do not metabolize codeine to morphine.

5. TMP 414 – Human Pathophysiology

This course will provide an in-depth introduction to basic concepts and fundamental principles of human pathophysiology for advanced undergraduate students. Students will learn to apply human anatomical principles to understand structural and functional changes at the tissue, organ, and systems levels that underlie clinically important diseases.

Potential perceived overlap: MBIOS 405—this discussion-based SMB course is entitled "Cell Biology of Disease," and appears to focus on cellular defects, "using popular press and research articles as a source of information." In contrast, our didactic course takes a more global approach and focuses on roles of tissues, organs and biological systems in pathogenesis, which provides the foundation for pharmacotherapy of disease.

6. TMP 424 – Human Clinical Neuropathology

Similar to most courses in this proposed program, Human Clinical Neuropathology is organized around pathogenesis, diagnosis, and treatment of human disease. This particular course breaks down the central nervous system based on anatomical regions and sensory or motor systems associated with each region. Capstone lectures link alterations in these anatomical regions/systems with human disease and treatment. For example, students will study how anatomical disruptions within the auditory system are linked to deafness and then discuss potential strategies for mitigating this disease therapeutically. Similarly, students will learn how

disruptions within the structure and wiring of the hypothalamus contribute to vegetative and endocrine imbalances, which can be pharmacologically addressed. The course also includes an active-learning component, a "clinical connection," in which groups of students present a clinical case involving some aspect of human neuropathology to their classmates and faculty.

Potential perceived overlap: NEUROSCI 425, which is cross-listed with a veterinary physiology course that appears to lack pharmacotherapy content and a focus on human disease.

7. PharMedS – 425 Medical Microbiology: Bugs and Drugs

This course is focused on the pharmacological treatment of infectious disease caused by bacteria, viruses, fungi, and parasites. Students will be given a brief introduction to the immune system, which is critical in the pharmacotherapy of infection, followed by a general overview of each class of infectious agent. The latter two-thirds of the course will cover pharmacotherapy, including the mechanism of antibiotic action, antibiotic resistance, tissue- and disease-specific considerations in the treatment of infection, and the roles of diagnosis, vaccination, and epidemiology in guiding and mitigating infectious disease.

Potential perceived overlap: MBIOS 410/411/426/440/442—all appear to lack consideration of the pharmacotherapy of infectious disease, which is the central focus of our course.

8. PharMedS – 445 Cancer Biology (elective)

This course is entirely focused on basic principles of cancer biology, including oncogenes, tumor suppressor genes, tumor viruses, genomic integrity and cancer development, cell cycle control, multi-step carcinogenesis, angiogenesis, invasion, metastasis, and tumor immunotherapy.

Potential perceived overlap: MBIOS 401—this cell biology course contains a "cancer biology" section amongst many other sections but our course is totally focused on cancer biology and appears to go into much more depth without content in other areas of cell biology.

C. Potential concern of College of Arts and Sciences (CAS)

- We have not been informed of any specific concerns of CAS, other than a general statement about overlap of our proposed program with pre-medical and -dental course and degree programs.
- No curricular overlap was found between our proposed transfer degree program with degrees or courses offered by CAS, including the undergraduate degree "Basic Medical Sciences."
- The title of our proposed program partially overlaps with the CAS degree in "Basic Medical Sciences."
- A precedent exists for "reusing" titles between majors and courses at WSU.
 1. There are multiple courses with "Physiology" in the title offered throughout WSU. Courses with "Exercise Physiology" in the title are offered by Nutrition and Exercise Physiology (Spokane) and by Kinesiology (Pullman).
 2. Integrative Pharmacology is currently taught in CPPS, and some version of Pharmacology has been taught in the College for over 100 years. Two courses in CVM have re-purposed the name "Pharmacology," and these are "Fundamentals of Pharmacology" and "Veterinary Pharmacology and Toxicology." This is normal and CVM should teach courses in Pharmacology from the veterinary angle.

- Finally, we were strongly advised by President Schulz, Provost Chilton, Executive Vice President for Health Sciences DeWald, and the Registrar's Office to base the name of our program on what it is, i.e., "Pharmaceutical and Medical Sciences," using standard terminology, so it could be easily understandable by prospective students, advisors, employers, and all other interested parties.

D. Summary

1. A tight linkage exists between the proposed program and strategic plans of both CPPS and ESFCOM, as well as the strategic plan and vision of the WSU system (see page 2).
2. The proposed program will have only a minimal effect on hiring of personnel and budgetary expenses in CPPS, ESFCOM, and the WSU system. Our curriculum will be entirely delivered by existing faculty and this does not create an overload situation for anyone (page 3).
3. The proposed program will have a positive effect on enrollment in CPPS and will serve to buffer the cyclical nature of enrollment in the college's professional (PharmD) program. This cycle has been in existence for at least 50 years. ESFCOM hopes to use the proposed program to enhance diversity recruiting into its professional (MD) program (page 3).
4. Close examination of course descriptions does not support claims of duplicity between the proposed program and courses offered on the Pullman campus by SMB (pages 3-6)
5. Duplicity between the proposed program and course or degree offerings in CAS was not found (pages 6-7).
6. The title of our proposed program does overlap partially with the "Basic Medical Sciences" degree in CAS, but there is precedent for re-using course and degree titles in the WSU system, and the unanimous opinion of WSU senior leadership and the Office of the Registrar supports our use of "Pharmaceutical and Medical Sciences" as the title for our proposed program (pages 6-7).
7. Undergraduate enrollment in the WSU system is experiencing a severe downturn, despite record freshman enrollments on the UW and UI campuses. The message is clear and unmistakable: we simply cannot continue to offer the same undergraduate programs, over and over, and hope for a different outcome. We need new undergraduate courses and new undergraduate programs if we want to grow our way out of our current situation. Our proposed undergraduate program in Pharmaceutical and Medical Sciences provides exactly that opportunity, as it will bring new students onto the Spokane campus and new students into the WSU system. Finally, the proposed program between two, Spokane-based colleges and in strong collaboration with CCS, provides an enormous opportunity for a WSU regional campus to serve its community, a concept that is entirely consistent with the expected role of regional campuses.

Thank you for the opportunity to respond to questions raised by the leadership of Faculty Senate.



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Date