



January 29, 2024

H. Dele Davies, MD  
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Dear Dr Davies:

I have received the request for establishing a new Bachelor of Science in Pharmaceutical Sciences at the University of Nebraska Medical Center (UNMC). Based on the information provided, I understand this will continue to fill a critical and unmet workforce need and advance the profession and practice of many disciplines by providing a solid foundation to prepare students for many career paths in the health professions.

As you know, there is a similar combined program offered by UNMC and UNO, however UNO is supportive of this proposal. I agree that the proposed UNMC B.S.P.S. program offers an important synergistic compliment to the UNO/UNMC combined program, offering the opportunity to engage with other partners in the region, including other NU system campuses, state and regional colleges, and community colleges, to create a pathway for students interested in healthcare and medical sciences.

Based upon our discussions and your recommendation, I concur with this decision and request that it be forwarded to the Board of Regents.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeffrey P. Gold'.

Jeffrey P. Gold, M.D.  
Chancellor

## MEMO

TO: Jeffrey P. Gold, MD  
Chancellor

FROM: H. Dele Davies, MD, MS, MHCM  
Senior Vice Chancellor for Academic Affairs  
Dean for Graduate Studies

DATE: January 26, 2024

RE: College of Pharmacy, Bachelor of Science in Pharmaceutical Sciences  
proposal

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Attached is a proposal for a Bachelor of Science in Pharmaceutical Sciences program. The Bachelor of Science in Pharmaceutical Sciences (B.S.P.S) is intended to provide a comprehensive undergraduate education for students interested in pharmacy (Pharm.D.) and other health professions (M.D., D.D.S.), pharmaceutical sciences, graduate programs, or for entry level-careers in the pharmaceutical or agricultural industries. The program will also provide a pathway for early admission into the Pharm.D. program and satisfy the prerequisites for other health profession degrees and graduate programs.

I have reviewed the revised document and I am in support of the request to submit to the Board of Regents.

# University of Nebraska Medical Center

## New Major or Degree

### I. Descriptive Information

<b>Name of Institution Proposing New Major or Degree</b>
University of Nebraska Medical Center
<b>Name of Proposed Major or Degree</b>
Pharmaceutical Science
<b>Degree to be Awarded to Graduates of the Major</b>
Bachelor of Science in Pharmaceutical Sciences
<b>Other Majors or Degrees Offered in this Field by Institution</b>
Doctor of Pharmacy (Pharm.D.), Ph.D. in Pharmaceutical Sciences, M.S. in Pharmaceutical Sciences
<b>CIP Code</b> <i>[browse here: <a href="http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55">http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55</a>]</i>
51.2010
<b>Subject Code</b>
<b>Administrative Units for the Major or Degree</b>
College of Pharmacy
<b>Proposed Delivery Site</b>
In person, University of Nebraska Medical Center, College of Pharmacy in Omaha and Kearney
<b>Program will be Offered</b> <i>[full program, not individual courses]</i>
<input checked="" type="checkbox"/> On-campus only <input type="checkbox"/> Distance only <input type="checkbox"/> Both (on-campus and distance)
<b>Date Approved by the Governing Board</b>
<i>[leave blank]</i>
<b>Proposed Date the New Major or Degree will be Initiated</b>
<i>[term/year]</i>

### II. Details

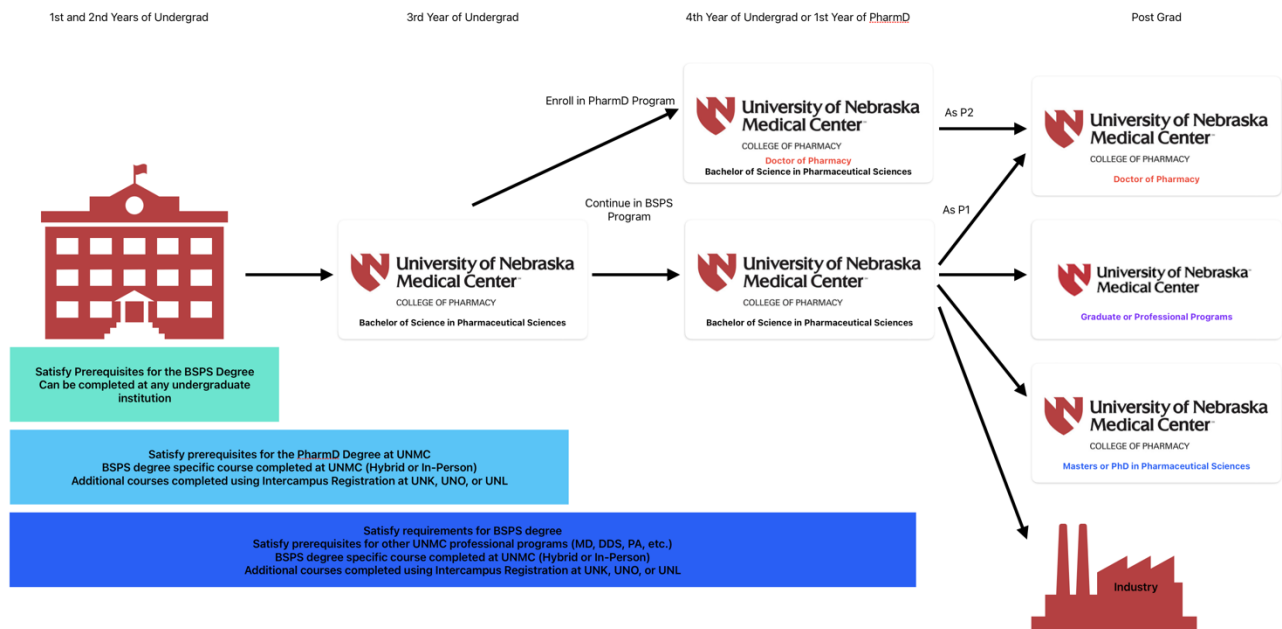
#### A. Purpose of the Proposed Major or Degree:

As the population of the United States (US) ages, the demand for health-care professionals including pharmacists and pharmaceutical scientists is expected to increase for two main reasons: life expectancy is increasing and the incidence of chronic disease is rising (“living longer, but sicker”). As the population ages, the demand for the development and approval of prescription drugs increases and generates a national need for a workforce for the pharmaceutical and agriculture industries. Future entry-level scientists and PhD-level scholars

in drug development and related careers, as well as future pharmacists and other health professionals, will benefit from a major with specialization in pharmaceutical sciences that begins at the undergraduate level. The Bachelor of Science in Pharmaceutical Sciences (B.S.P.S.) is intended to provide a comprehensive undergraduate education for students interested in Doctor of Pharmacy (Pharm.D.), other health professional degrees (e.g. M.D., D.D.S.), Pharmaceutical Sciences and other graduate programs, or for entry-level careers, such as medical sales representatives or pharmaceutical research technicians. A purpose of the program is to provide a pathway of well-qualified candidates for admission to the College of Pharmacy and other professional degree programs at University of Nebraska Medical Center (UNMC), and to build a workforce for biomedical, biochemical, agriculture scientists and technicians for the development, testing, and regulatory approval of new drugs. The program also will provide a foundational education in step with projections for how the work of pharmacists, scientists and technicians will change over the next ten years.

The unique design of the B.S.P.S. program (Figure 1) is intended to provide students flexibility in earning the B.S.P.S. degree, while providing a pathway for early admissions into the Pharm.D. program or satisfying the prerequisites for other health profession degrees and graduate education. This program is unique in that students can work directly via internships under the supervision of world-renowned pharmaceutical sciences faculty at the UNMC College of Pharmacy. The UNMC Bachelor of Science in Pharmaceutical Sciences will be comprised of coursework delivered by faculty in the College of Pharmacy (COP) with general education and pre-requisite coursework taken at the University of Nebraska at Kearney (UNK), the University of Nebraska - Lincoln (UNL), the University of Nebraska at Omaha (UNO), and other colleges and universities within the State or beyond. Students will complete degree pre-requisites (60 credit hours) at any 2- or 4-year undergraduate institution before being admitted to UNMC. By the end of their first year at UNMC, students will have met the pre-requisites for the Pharm.D. degree and can apply directly into the Pharm.D. program. Students entering the Pharm.D. program will receive their B.S.P.S degree upon successful completion of the first year of the UNMC Pharm.D. program.

Figure 1. Program Overview



## B. Description of the Proposed Major or Degree:

*Describe the structure, objectives and plans to regularly review and revise the program to reflect new developments in the discipline.*

- Structure
  - 2 + 2 – first two years as UNK/UNO/UNL, state or community college student, or from any program that would meet the general requirements of the major + latter two years as a UNMC student
- Objectives
  - Prepare students for entrance into workforce, professional programs or graduate school.
  - Provide a pathway of well-qualified candidates for admission to the professional programs; College of Pharmacy (COP), College of Medicine (COM), College of Dentistry (COD), College of Allied Health Professions (CAHP) at UNMC or beyond.
  - Provide students with an outstanding biomedical/biochemical foundation to prepare them for advanced graduate programs at UNMC or beyond.
  - Provide students with an outstanding biomedical/biochemical foundation to prepare them to enter the workforce and contribute to the development, testing, and regulatory approval of new drugs.
  - Offer a major pathway to professional and graduate programs at UNMC.
  - Provide a flexible pathway for students to have multiple avenues to pursue after completing this program. Thus, the B.S.P.S is ideal for students who know they want to be involved with health professions or biomedical research, but are undecided on their ultimate career path.
- Plans to Review and Regularly Revise the Program
  - The B.S.P.S. Program Director, a newly created position at the UNMC COP will lead the College's review and revision process.
  - An Undergraduate Curriculum Committee will be formed to work with the Program Director and oversee the B.S.P.S. curriculum, including curricular assessment.
  - While the Program Director and Undergraduate Curriculum Committee will continuously review the program, the program will undergo a comprehensive review every five years. During the comprehensive review, feedback will be obtained from stakeholders, including the UNMC COM, COD, CAHP, Graduate Programs, as well as employers.

*The primary student learning outcomes of the proposed major or degree.*

- Demonstrate knowledge and technical ability in the basic and pharmaceutical sciences
- Apply critical thinking and problem solving skills in the pharmaceutical sciences
- Communicate effectively to diverse professional and lay audiences

*Admission criteria and selection procedures for students seeking admission to a major or degree. Include strategies designed to enhance the recruitment, retention, and success of students from diverse backgrounds.*

- 60 credit hours of prerequisites (Approximately 2 years of undergraduate education):
  - General Chemistry I with lab (4 credits)
  - General Chemistry II with lab (4 credits)
  - Organic Chemistry I with lab (5 credits)
  - Organic Chemistry II with lab (5 credits)
  - Biology I with lab (4 credits)

- Biology II with lab (4 credits)
  - Cell and Molecular Biology (3-4 credits)
  - Physics I with lab (5 credits)
  - Calculus I (5 credits)
  - English Composition I (3 credits)
  - Speech/Public Speaking (3 credits)
  - General Psychology (3 credits)
  - General Electives (11-12 credits)
- Minimum GPA of 2.0
  - No entrance exam required.
  - No undergraduate institution preference.
  - Selection criteria: student interest in healthcare or research career, completion of prerequisites, strong academic track record, communication skills, letters of recommendation

*Identify new courses that will be needed to implement the program.*

- PHSC –Career Pathways in Pharm Sci (new course)
- PHPR – Contemporary Med Use (new course)
- PHSC - Foundations of Molecules to Medicine I (new course)
- PHSC - Applied Molecules to Medicine II (new course)
- PHSC Biochemistry I
- PHSC Analytical Chemistry and Lab (or other approved course)
- PHPR/PHSC - Introductory Research
- PHPR/PHSC - Advanced Research

*Identify any collaborative agreements with other postsecondary institutions to expand the curriculum, if applicable.*

- While the program and degree will be offered through the UNMC COP, it will involve collaboration with the other University of Nebraska campuses, the Nebraska state college system, and regional community colleges. Students could fulfill the first two years of the degree requirements at any of those institutions. The COP advisors will work closely with academic advisors at the other programs to help students successfully complete their prerequisites.
- Some UNMC classes will be offered by colleges outside of the COP. The other colleges at UNMC have confirmed their support of the program and willingness to allow B.S.P.S. student to enroll in courses necessary to complete their degree.

*The credit hour and course requirements, program of study, research and other academic requirements for students enrolled in the major or degree program.*

Course numbers and names may vary depending on the prerequisite institution attended. The following uses course numbers and names from the University of Nebraska at Kearney (UNK), Wayne State College (WSC), and Northeast Community College (NECC) **as examples** to demonstrate how the prerequisites could be fulfilled at a variety of institutions. Similar pathways have been mapped for other state and community colleges.

Course Name	UNK	WSC	NECC	Credit Hours
<b>Non-UNMC Courses (Years 1 and 2)</b>				<b>60</b>
<b>Chemistry Courses</b>				<b>18</b>
General Chemistry I and Lab	CHEM 160/ CHEM 160L	CHE 106	CHEM 1090	4
General Chemistry II and Lab	CHEM 161/ CHEM 161L	CHE 107	CHEM 1100	4
Organic Chemistry I and Lab	CHEM 360/ CHEM 360L	CHE 314	CHEM 2510	5
Organic Chemistry II and Lab	CHEM 361/ CHEM 361L	CHE 315	CHEM 2520	5
<b>Biology Courses</b>				<b>11-12</b>
Biology I and Lab	BIOL 105	BIO 110	BIOS 1010	4
Biology II/ Microbiology and Lab	BIOL 106	BIO 385	Not available	4
Cell and Molecular Biology	BIOL 309	BIO 434	BIOS 2460	3-4
<b>Physics Courses</b>				<b>5</b>
General Physics I with Lab	PHYS 275/ 275L	PHY 301/ 321	PHYS 2110	5
<b>Math Courses</b>				<b>5</b>
Calculus I with Analytical Geometry	MATH 115	MAT 140	MATH 1600	5
<b>General Education Courses</b>				<b>20-21</b>
English Composition	ENG 101 or ENG 102	ENG 102	ENGL 1010	3
Speech Communication	SPCH 100	CAN 100	SPCH 1010	3
General Psychology	PSY 203	PSY 345	PSYC 1810	3
General Electives <sup>1</sup>				11-12
<b>UNMC Courses (Years 3 and 4)</b>				<b>60</b>
<b>Pharmaceutical Sciences/Pharmacy Courses</b>				<b>36</b>
PHSC –Career Pathways in Pharm Sci (new course)				2
PHSC 550 Intro to Pharm Sci				4
PHSC 691 Pharmaceutical Science Applications in Pharmacy				2
PHPR – Contemporary Med Use (new course)				2
PHSC - Foundations of Molecules to Medicine I (new course)				3
PHSC - Applied Molecules to Medicine II (new course)				3
PHPR/SC Research Experience I				3
PHPR/SC Research Experience II				3
PHSC Biochemistry I (new course)				4
PHSC Analytical Chemistry and Lab (new course)				4
Pharmaceutical Sciences/Pharmacy Electives				6
<b>Other UNMC Courses</b>				<b>24</b>
CAHP 462* Human Anatomy & Physiology I <sup>2</sup>				4
CAHP 463* Human Anatomy & Physiology II <sup>2</sup>				4

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GENC 641* Principles and Applications of Human Genetics			3
CPH 506* Biostatistics			3
UNMC Electives <sup>3</sup>			10
<b>Total</b>			120

<sup>1</sup>To satisfy the UNMC PA requirements, general elective should include a second English writing or writing-intensive course, Abnormal Psychology, and Life Span/Developmental Psychology.

<sup>2</sup>UNMC Medical and PA programs require a lab to be included with HA&P 1 and II

<sup>3</sup>To satisfy the UNMC PA requirements, UNMC elective should include Medical Terminology (CAHP 310) and Immunology (CAHP 404).

\*Existing UNMC courses offered by the College of Allied Health Professions and the College of Public Health.

The following is an example course of study using the course titles in the previous table. All UNMC courses will be offered in hybrid format and originate from either UNMC's Omaha or Kearney campuses.

Course Number	# Credit Hours
<b>Semester 1</b>	
Biology I and Lab	4
General Chemistry I and Lab	4
Calculus I with Analytical Geometry	4
English Composition	3
<b>Semester 2</b>	
Biology II/Microbiology and Lab	4
General Chemistry II and Lab	4
Speech Communication	3
Unrestricted Elective	3
<b>Semester 3</b>	
General Physics I with Lab	5
Organic Chemistry and Lab	5
General Psychology	3
Unrestricted Elective	3
<b>Semester 4</b>	
Cell and Molecular Biology and Lab	4
Organic Chemistry II and Lab	5
Unrestricted Elective	3
Unrestricted Elective (Physics II for COM, COD and CAHP)	3
<b>Semester 5</b>	
PHSC TBD* – Biochemistry	4
CAHP 462 Anatomy and Physiology I	4
PHSC TBD* – Career Pathways in Pharm Sci	<u>2</u>
PHSC 550 Intro to Pharm Sci	4



<b>Semester 6</b>	<b>14</b>
CAHP 463 Anatomy and Physiology II	4
PHSC 691 Pharmaceutical Science Applications in Pharmacy	2
PHPR TBD* – Contemporary Med Use	2
UNMC Elective	3
UNMC Elective	3
<b>Semester 7</b>	<b>16</b>
PHSC TBD* Analytical Chemistry and Lab	4
PHSC TBD* - Foundations of Molecules to Medicine 1	3
PHPR/SC Research Experience	3
UNMC Elective	3
Pharmaceutical Sciences/Pharmacy Elective	3
<b>Semester 8</b>	<b>16</b>
CAHP 641 Genetics	4
PHSC TBD*- Applied Molecules to Medicine 2	3
PHPR/SC Research Experience II	3
CPH 506 Biostatistics	3
Pharmaceutical Sciences/Pharmacy Elective	3
<b>Total</b>	<b>120</b>

*\*TBD – To be developed*

*How and when advisors are assigned for students in the major or degree.*

- During the first semester in the UNMC program students will be assigned a faculty advisor from the faculty teaching within the program. Advising assignments will be made by the program director based on the goals of the student, and in consultation with the faculty member's department chair.

*If applicable, national guidelines or accreditations for such programs, and how this program meets the established standards.]*

- There are no national guidelines or accreditations for B.S.P.S. programs. The American Academy of Colleges of Pharmacy (AACCP) has had initial discussions related to guidelines for B.S.P.S. programs, and the College would be an active participant in the guideline discussions and would take appropriate steps to conform to those guidelines.

*Identify any partnership agreements that will enhance the program's quality or provide educational or practical experiences for the students.*

- UNMC College of Pharmacy will explore partnership agreements with Northeast Community College, Mid-Plains Community College and other Nebraska Community Colleges to provide clear guidance for a pre-requisite course of study. COP will also explore partnerships with the State Colleges and other

undergraduate institutions. Through our conversations with these local organizations, there is strong enthusiasm for this type of program and partnership.

*Impact on Course Subject Codes; will any subject codes need to be created, modified, or deleted in relation to the creation of this program.*

- N/A

### III. Review Criteria

#### A. Centrality to UNMC Role and Mission

The B.S.P.S supports UNMC's Mission and Strategic Plan.

##### *Educational Learner Focus*

##### Strategy 2

Strengthen programs with K-12 schools, community, and state colleges. Work with K-12 schools, community, state and other Nebraska colleges, and University of Nebraska campuses to interested Nebraska students in healthcare careers and to establish strong pathway programs to build a truly diverse and inclusive health professions workforce.

The proposed program supports UNMC's goal of creating interest in healthcare careers by designing a curriculum that will serve as a pathway to existing UNMC COP and other UNMC health professions programs. The partnerships with the University of Nebraska campuses and community colleges will provide students with opportunities to interact with a broader base of academic and clinical faculty than would be typical for undergraduate students. The program will develop a cohort of students prepared for the rigors of either a professional or graduate program by providing a diverse set of learner's access to COP faculty, courses, and research opportunities.

##### Strategy 9

Eliminate curricular redundancy and optimize total time of education per degree. Establish Interprofessional workgroups and in every College to determine whether their health profession degree programs that bridge with NU undergraduate and state college campuses can eliminate educational redundancy, reduce total time of education per degree granted and work toward reduction of overall tuition expenditure.

The proposed program supports UNMC's goal of optimizing time to degree by providing a clear pathway to admission into the Pharm.D. program after 3 years, which reduces the total time to the Pharm.D. degree to 7 years. The program further supports the goal of reducing redundancy by allowing 1st year Pharm.D. coursework to count towards the B.S.P.S degree, which reduces total time of education towards the degrees and reduces overall tuition expenditures. The degree will utilize other University of Nebraska campuses, state colleges, and community colleges for prerequisite and elective credits. It will also allow other UNMC college course offerings to fulfill the required coursework.

#### B. Relationship of the proposal to the NU Five-Year Strategy

**The B.S.P.S. program supports the University of Nebraska Five-Year Strategic Plan in the following ways:**

- Fulfilling Nebraska's workforce needs. The B.S.P.S. contributes to a highly trained workforce for healthcare and develops pipeline programs to UNMC Pharmacy and other health professional programs as well as medical and agriculture-based scientists.
- Amplifying our impact through partnerships. The B.S.P.S. leverages existing courses offered on the other NU campuses, state colleges, and Nebraska community colleges, which allows for efficiency in offering the program. These partnerships will extend access to students throughout the state. It will also involve industry partners who serve on the COP Dean's Advisory Boards.
- Accessible, Affordable and Attainable Education. The B.S.P.S. will provide access to a unique and high demand UNMC program at the new UNMC-UNK collaborations and throughout the rest of Nebraska.

### C. Consistency with the Comprehensive Statewide Plan for Post-Secondary Education

Program support for relevant statewide goals for education.

- *Nebraska's postsecondary education institutions will be student-centered and will offer learning opportunities that are responsive to students' needs.*

The program strongly supports learning opportunities that are student-centered. The program offers built-in opportunities for engagement between students and faculty in coursework and experiential learning opportunities. For example, the research experience courses are one-on-one experiences where students will spend time in a faculty member's laboratory.

- *Practical research requirements are embedded at multiple points in the program. This will provide individualized research training and mentorship with faculty. A student may have multiple research opportunities throughout the B.S.P.S. curriculum, meaning that they may benefit from multiple experiences and mentors.*
- *Postsecondary education in Nebraska will be responsive to the workforce development and ongoing training needs of employers and industries to build and sustain a knowledgeable, trained, and skilled workforce in both rural and urban areas of the state.*

The B.S.P.S. will support workforce development by contributing to the preparedness of graduates for entering PharmD program, other professional schools, Pharmaceutical Sciences graduate programs, and the agricultural or pharmaceutical industry as medical scientists and technicians. By being housed in the College of Pharmacy at UNMC, graduates of the program will have workforce readiness skills including communication, teamwork skills and will receive targeted skills in a professional field that is changing as health care practices and drug delivery development evolves.

- *Postsecondary education institutions will work as partners with one another and with other entities, including those in the private sector, whenever appropriate to share resources and deliver programs cooperatively to enhance learning opportunities for Nebraska residents.*

The program is a collaboration between UNMC and the state's other universities, colleges, and community colleges that leverages the expertise of each institution. It is new and distinct from other programs at UNMC but developed by leveraging existing resources at UNMC. There is new coursework to support the program, but it is maximizing existing coursework. Northeast Community College is an example of a collaborator that recognizes the value of the program and the unique opportunity it represents to students in northeast Nebraska.

### D. Evidence of Need and Demand

#### 1. Need:

The proposed UNMC B.S.P.S. is responsive to efforts to increase graduates who qualify for high-skilled and high-paying jobs. There are three major pathways for graduates of the proposed B.S.P.S. The first pathway would provide a pipeline to graduates interested in pursuing further health professional education with the goal of providing patient care (Pharm.D., M.D., D.D.S., other health sciences, or veterinary sciences). The second offers a pipeline for graduates interested in pursuing advanced training to become a biomedical research scientist (e.g., M.S., Ph.D. programs). The third offers a pipeline of graduates to entry level positions within the animal agriculture or pharmaceutical industry or clinical research organizations.

The proposed UNMC B.S.P.S. will contribute to ensuring well-qualified applicants to programs offered by the UNMC COP, including the Pharm.D. program and Ph.D and M.S. programs in Pharmaceutical Sciences. For

*Adapted from UNL AA-GP1 – Major or Degree Proposal Form*

students who know that they wish to pursue a Pharm.D. professional degree, the B.S.P.S will offer an opportunity to directly transition to the UNMC Pharm.D. curriculum, after meeting the undergraduate prerequisites. The UNMC B.S.P.S provides an added benefit of building relationships with UNMC faculty during their undergraduate training. In addition, the program has been designed to meet other UNMC health profession degree program prerequisites, offering an alternative undergraduate major option in addition to the commonly selected majors, such as Biology, Chemistry, Molecular and Biomedical Biology, and Neuroscience, to support student's pathways to other health professional schools.

Workforce demand for Pharm.D. graduates.

Over the next ten years, more pharmacists will work in institutional healthcare settings, outpatient clinics, and other non-retail positions. The B.S.P.S. from the UNMC College of Pharmacy will emphasize both the skills and the foundational sciences courses needed to enter any degree program at UNMC. In contrast to the national projections, which estimate a 2.1% decline from 2020-2030 in the demand for pharmacists (due to mail order, automation, and online prescription services), there is a projected growth in Nebraska of +1.4% (<https://www.projectionscentral.com/Projections/LongTerm>). Even greater increases in demand for pharmacists are predicted for states in the Midwest where UNMC graduates often practice (CO 15.5%, IA 5.5%, KS 2.8%, ND 7.8%, SD 4.0%).

Workforce demand for medical scientists.

The long-term job outlook for medical scientists (a job category that includes pharmaceutical scientists) who contribute to the development of drugs through both research and development is projected to grow at 6% from 2019-2029 compared to 4% for all occupations (<https://www.bls.gov/ooh/lifephysical-and-social-science/medical-scientists.htm>). From 2020-2030, an 12.2% to 50% increase in demand for medical scientists is predicated for Nebraska (12.3%) and surrounding states (CO 27.3%, IA 18.8%, KS 16.7%, MN 12.2%, MO 27.9%, ND 50.0%, SD 21.7%) (<https://www.projectionscentral.com/Projections/LongTerm>). Graduates of the UNMC B.S.P.S would also be highly competitive applicants for graduate programs in biochemistry. Employment growth in the category of Biochemists and Biophysicists is projected at 4.9% nationally, and 11.1% in Nebraska.

The proposed B.S.P.S. also prepares graduates for a variety of entry-level positions in the pharmaceutical and medical industry. These are often high wage, high demand, and high skill jobs (H3). As industry is innovating in the areas of drug therapy, medicine production, and drug delivery, pharmaceutical sciences graduates will be in demand. This includes career opportunities in sales and marketing, drug research and development, clinical research, quality assurance, professional services, pharmaceutical manufacturing, chemical manufacturing, food and beverage manufacturing, biomedical and bioscience, testing laboratories, and technical consulting services. A search on the Indeed job website for 'pharmaceutical and medical sales' shows 53 job openings in Nebraska in the field of pharmaceutical sales with salaries listed up to \$188,000. In addition, it is important to note that B.S. degree programs in Pharmaceutical Sciences are not widespread. Nationwide, there are only 20-25 institutions offering such a program. The program offered by UNMC would allow us to serve the Nebraska and Midwest region and is aligned with the University of Nebraska's strategic efforts of creation of the Center for Drug Design and Innovation, approved this summer by the Coordinating Commission for Postsecondary Education (CCPE). The success of the new Center will depend on a well-trained workforce. Individuals with the proposed B.S.P.S. will have opportunities as technicians entry level scientists. Those B.S.P.S. graduates who go on to professional or graduate degrees may have the opportunity to be directly involved with discovering therapeutic molecules and advancing these new products through the research and development pathway to regulatory approval. Finally, according to the 2022 Nebraska Manufacturing Facts published by the National Association of Manufacturers (<https://www.nam.org/state-manufacturing-data/2022-nebraska-manufacturing-facts/>), pharmaceutical and medicine manufacturing was the highest sector with manufacturing job openings in 2021.

Overall, according to the U.S. Bureau of Labor Statistics, the healthcare industry and medical science industry will experience significant growth in the coming years due to an aging population and scientific advances. They project the healthcare industry will experience a 13% growth in employment, and medical scientists will experience a 17% growth in employment between 2021 to 2031. In total, these statistics reflect 2 million job openings each year (<https://www.bls.gov/ooh/healthcare/home.htm>), emphasizing the role that the B.S.P.S. may play in future career opportunities.

Enrollment projections for the B.S.P.S. are:

Year 1: 10 new students

Year 2: 16 new students

Year 3: 24 new students

Year 4: 30 new students

Year 5: 36 new students

These projections are based, in part, on observations of the growth of other new programs along with labor statistics cited previously. In addition, conversations with UNMC academic leaders outside of the COP indicates that a UNMC would be viewed favorably to a degree from other undergraduate programs (see letters of support). We expect this will increase demand for the degree amongst students seeking professional or graduate degrees. The first three years are predicted to have low enrollments. Growth is expected to increase once Year 1 and Year 2 students are visibly advancing in the program and share their experiences with other students. Because most coursework exists with capacity for enrollment, the minimum number of students required to make this program viable is 10 graduates per year.

#### **E. Avoidance of Unnecessary Duplication**

We acknowledge that there is currently a B.S.P.S. program based at The University of Nebraska Omaha campus and taught by UNMC faculty members. The program enrolled the first students in January 2022 and 36 students have declared this as a major at UNO. The proposed UNMC B.S.P.S. program offers an important compliment to the UNO program, offering the opportunity to engage with other partners in the region, including other NU system campuses, state and regional colleges, and community colleges, to create a pathway for students interested in healthcare and medical sciences. The UNMC program also offers an important opportunity to launch in parallel with the UNMC-UNK health science collaboration, offering students the opportunity to work with UNMC faculty, and a desirable, direct path to UNMC programs. The primary focus is to expand opportunity beyond UNO students to others in the state who have interest in this area.

There are accelerated Pharm.D. programs in the Midwest States of Kansas, Missouri, Iowa, South Dakota, North Dakota, and Minnesota, and several of these grant B.S.P.S. or Health Sciences degrees as part of an accelerated Pharm.D. program. However, these accelerated programs are embedded in each university's College of Pharmacy and offer students a shortened timeline from starting their bachelor's degree to completing a PharmD. For example, at Creighton, undergraduates complete two years of college coursework and enter the Pharm.D. program in their third year. The B.S.P.S. is awarded after the second year of the PharmD coursework and the Pharm.D. at the conclusion of six-year of coursework. In contrast to existing programs, the proposed UNMC B.S.P.S program will be unlike other accelerated Pharm.D. programs in the region by *allowing students to have the option to complete this degree independently from their Pharm.D.* In addition, the UNMC program will offer an accelerated pathway into the UNMC COP PharmD program, which will be highly desirable to minimize student debt. Outside of just the Pharm.D., the program will allow students to have the flexibility to decide upon their individual career path as they progress through their academic program and learn about new career pathways. The UNMC program has been designed to facilitate ease of matriculation to most UNMC graduate or professional programs. Specifically, the coursework meets the prerequisite for all UNMC programs, providing

flexibility for a student who is interested in healthcare or medical sciences, but still unsure of their specific career path.

The UNMC B.S.P.S program is complimentary to the UNO program and is unique to other programs in the region. Specifically, the UNMC program will expand the availability of this program to alternative and broad student populations in the state, including community colleges and other regional colleges and universities. The UNMC B.S.P.S. program is well-positioned and well-timed to leverage the UNMC – University of Nebraska at Kearney collaboration, housed in the Rural Health Education building. Through this collaboration, a UNMC B.S.P.S. will provide opportunities to reach a larger geographic area outside of Omaha for those students interested in the B.S.P.S. program as a terminal degree, as well as those who desire a pathway to UNMC professional degree programs offered both in Omaha and in Kearney. The UNMC B.S.P.S will be a vital component of the UNMC-UNK collaboration, advancing the goal to provide opportunities for careers in healthcare and medical sciences, and to improve access to high quality healthcare in rural settings.

**F. Adequacy of Resources:**

1. Faculty/Staff

The UNMC COP will need to hire one additional faculty member to serve as director of the degree program. The hire will have additional responsibilities teaching in the Pharm.D. program and will be based in Kearney, NE. The position will be fully funded through the College of Pharmacy's Kearney expansion budget. The COP will similarly need to hire student affairs associate to manage the unique nature of the undergraduate program, including admissions, transfer credits, and partner relations. Again, this will be funded through the COP's Kearney expansion budget.

2. Library/Information Resources

UNMC's library and information resources are more than adequate to meet the needs of the program. Students outside of the UNMC campus will have electronic access to library materials. As part of the UNMC Kearney expansion, additional library resources, including librarians, will be accessible to students in Kearney.

3. Physical Facilities and Equipment

Classroom space for the B.S.P.S has been included in the COP's Kearney expansion plan. The UNMC College does not require any additional facilities or equipment to offer the program.

4. Instructional Equipment and Informational Resources

No additional instructional equipment or informational resources are needed to support the B.S.P.S.

5. Budget Projections

See attached.

**TABLE 1: PROJECTED EXPENSES - NEW INSTRUCTIONAL PROGRAM**

	(FY2025) Year 1		(FY2026) Year 2		(FY2027) Year 3		(FY2028) Year 4		(FY2029) Year 5		Total	
	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost
<b>Personnel</b>												
Faculty	1	\$225,000	1	\$231,000	1	\$238,000	1	\$245,000	1	\$253,000		\$1,192,000
Professional												\$0
Graduate assistants												\$0
Support staff	1	\$65,000	1	\$67,000	1	\$69,000	1	\$71,000	1	\$73,000		\$345,000
Subtotal	2	\$290,000	2	\$298,000	2	\$307,000	2	\$316,000	2	\$326,000		\$1,537,000
<b>Operating</b>												
General Operating												\$0
Equipment												\$0
New or renovated space												\$0
Library/Information Resources												\$0
Other <sup>1</sup>		\$40,480		\$64,768		\$64,768		\$64,768		\$64,768		\$299,552
Subtotal		\$40,480		\$64,768		\$64,768		\$64,768		\$64,768		\$299,552
<b>Total Expenses</b>		\$330,480.00		\$362,768.00		\$371,768.00		\$380,768.00		\$390,768.00		<b>\$1,836,552.00</b>

<sup>1</sup> Tuition transferred to other UNMC units offering courses to BSPS student.



**TABLE 2: REVENUE SOURCES FOR PROJECTED EXPENSES - NEW INSTRUCTIONAL PROGRAM**

	FY(2025) Year 1	(FY2026) Year 2	(FY2027) Year 3	(FY2028) Year 4	(FY2029) Year 5	<b>Total</b>
Existing Funds <sup>1</sup>	\$290,000	\$290,000	\$290,000	\$290,000	\$290,000	\$1,450,000
Required New Public Funds						\$0
1. State Funds						\$0
2. Local Tax Funds (community colleges)						\$0
Tuition and Fees <sup>2</sup>	\$77,700	\$274,320	\$355,400	\$402,020	\$433,100	\$1,542,540
Other Funding						\$0
1						\$0
2						\$0
3						\$0
<b>Total Revenue</b>	<b>\$367,700</b>	<b>\$564,320</b>	<b>\$645,400</b>	<b>\$692,020</b>	<b>\$723,100</b>	<b>\$2,992,540</b>

<sup>1</sup> These funds are included in the College of Pharmacy's Kearney Expansion budget. They will not impact funding for other programs.

<sup>2</sup> Tuition calculations are based on UNMC Undergraduate Resident tuition rate of \$259 per credit hour for students enrolled only in the BSPS program and the UNMC PharmD annual tuition of approximately \$25,000

	BSPS 1st Yr	BSPS 2nd Yr	BSPS PharmD	Credit Hours	Tuition	PharmD Tuition	Total Tuition
Year 1	10			300	77700	0	77700
Year 2	12	4	6	480	124320	150000	274320
Year 3	16	4	8	600	155400	200000	355400
Year 4	18	8	8	780	202020	200000	402020
Year 5	20	10	8	900	233100	200000	433100

# Bachelor of Science in Pharmaceutical Sciences

## Abstract

The health care and pharmaceutical industry is highly specialized requiring advanced training for most positions, even those that are entry-level. Additionally, the demand for health-care professionals, scientists, and laboratory staff is expected to increase over the next decade as the population ages and the need for clinical caregivers and scientists to create new pharmacological treatments for chronic diseases. The demand for advanced workers is also needed in the agricultural sector as many new drugs and chemicals will be needed as the world population increases coupled with weather related changes. The Bachelor of Science in Pharmaceutical Sciences (B.S.P.S) is intended to provide a comprehensive undergraduate education for students interested in pharmacy (Pharm.D.) and other health professions (M.D., D.D.S.), pharmaceutical sciences, graduate programs, or for entry level-careers in the pharmaceutical or agricultural industries.

The unique design of the B.S.P.S will expose students to a wide range of courses not available at other Colleges because of the world-renowned faculty at the UNMC College of Pharmacy (COP). The program will also provide a pathway for early admission into the Pharm.D. program and satisfy the prerequisites for other health profession degrees and graduate programs. The program is unique in students will work directly via internships under the supervision of UNMC faculty with exposure to the latest technology used in drug development, drug delivery and mechanisms of pharmacology and disease processes. Students can also participate in internships with the pharmaceutical industry and related fields. The B.S.P.S will be comprised of coursework delivered by COP faculty and supplemented by coursework taken at the University of Nebraska-Kearney, University of Nebraska-Lincoln, University of Nebraska-Omaha, as well as other undergraduate and community colleges through the State. Students will complete degree prerequisites (minimum 60 hours) at any 2- or 4-year undergraduate institution before being admitted to the UNMC COP. By the end of the first year B.S.P.S students will have met prerequisites for the Pharm.D. program and can apply directly for admissions to the program, or students can remain in the program, graduate, and be eligible to join the workforce or pursue admission into other health care professions.

## Letters of Support

### Internal

Dr. Kenneth Bayles, Vice Chancellor for Research, University of Nebraska Medical Center

Dr. Bradley Britigan, Dean of the College of Medicine, University of Nebraska Medical Center

Dr. Kyle Meyer, Dean of the College of Allied Health Professionals, University of Nebraska Medical Center

Dr. Ali Khan, Dean of College of Public Health, University of Nebraska Medical Center

### External

Dr. Jeff Hoffman, Dean of Health and Public Services, Northeast Community College

Dr. Gangadhar Sunkara, Global Program Head, Novartis Pharmaceuticals Corporation

Dr. Melanie Bloom, Dean of the College of Arts and Sciences, University of Nebraska - Omaha



March 26, 2024

Keith M. Olsen, Pharm.D., FCCP, FCCM  
Joseph D. Williams Endowed Dean  
College of Pharmacy  
University of Nebraska Medical Center

Dear Dr. Olsen:

I am writing to offer my strongest support for the UNMC College of Pharmacy (COP) proposal to develop a Bachelor of Science in Pharmaceutical Sciences (BSPS) degree program. The proposal represents an innovative approach to providing students with a comprehensive undergraduate degree for a variety of entry-level roles in the science-related workforce, as well as providing the requisite bachelor's degree for students seeking health profession degrees, or graduate degrees in the basic and clinical sciences.

Both the expressed intent of the degree and the proposed curriculum demonstrate its potential value for students interested in pursuing graduate health profession degrees housed within the College of Allied Health Professions (CAHP). The curriculum the CAHP reviewed in March 2024 contains undergraduate prerequisites consistent with the requirements for application to a variety of programs in the CAHP, including the Physician Assistant Program.

Completion of the program at UNMC will ensure undergraduate students have the unique opportunity to work with world renowned scientists throughout the colleges and institutes at UNMC and will expose students to a variety of biomedical research and health profession options for continued study, should they so choose. In addition, the CAHP would be pleased to partner with the COP to utilize existing courses in the CAHP to fulfill elective requirements for the BSPS degree. I strongly support your efforts to establish this exciting new program.

Sincerely,

A handwritten signature in blue ink that reads "Kyle P. Meyer".

Kyle P. Meyer, PhD, MS, FASAHP  
Founding Dean  
College of Allied Health Professions



March 22, 2024

Keith M. Olsen, Pharm.D., FCCP, FCCM  
Joseph D. Williams Endowed Dean  
College of Pharmacy  
University of Nebraska Medical Center

Dear Dr. Olsen:

I am writing this letter to offer my strongest support for your proposal to develop an UNMC undergraduate degree in pharmaceutical sciences. This program will provide an important avenue for students seeking professional degrees, entry level science jobs, and opportunities to achieve MS or PhD degrees in basic and clinical sciences. This undergraduate program would accelerate our efforts to increase the workforce with highly qualified graduates. The UNMC program is unique as students have the opportunity to work with world renowned scientists throughout the colleges and institutes on our campus. Therefore, I strongly support your efforts to establish this exciting new program.

Sincerely,

A handwritten signature in black ink that reads "Bradley Britigan". The signature is written in a cursive style.

Bradley E. Britigan, M.D.  
Stokes-Shackleford Professor and Dean



December 8<sup>th</sup>, 2023

Keith M. Olsen, Pharm.D., FCCP, FCCM  
Joseph D. Williams Endowed Dean  
College of Pharmacy  
University of Nebraska Medical Center

Dear Dr. Olsen:

I am writing to offer my strongest support for the UNMC College of Pharmacy (COP) proposal to develop a Bachelor of Science in Pharmaceutical Sciences (BSPS) degree program. The proposal represents an innovative approach to providing students with a comprehensive undergraduate degree for a variety of entry-level roles in the science-related workforce, as well as providing the requisite bachelor's degree for students seeking health profession degrees, or graduate degrees in the basic and clinical sciences.

Both the expressed intent of the degree and the proposed curriculum demonstrate its potential value for students interested in pursuing graduate health profession degrees housed within the College of Allied Health Professions (CAHP). The curriculum contains undergraduate prerequisites consistent with the requirements for application to a variety of programs in the CAHP.

Completion of the program at UNMC will ensure undergraduate students have the unique opportunity to work with world renowned scientists throughout the colleges and institutes at UNMC and will expose students to a variety of biomedical research and health profession options for continued study, should they so choose. I strongly support your efforts to establish this exciting new program.

Sincerely,

A handwritten signature in blue ink that reads "Kyle P. Meyer".

Kyle P. Meyer, PhD, MS, FASAHP  
Founding Dean  
College of Allied Health Professions



March 25<sup>th</sup>, 2024

Keith M. Olsen, Pharm.D., FCCP, FCCM  
Joseph D. Williams Endowed Dean  
College of Pharmacy  
University of Nebraska Medical Center

Dear Dr. Olsen:

I am writing to offer my strongest support for the UNMC College of Pharmacy (COP) proposal to develop a Bachelor of Science in Pharmaceutical Sciences (BSPS) degree program. The proposal represents an innovative approach to providing students with a comprehensive undergraduate degree for a variety of entry-level roles in the science-related workforce, as well as providing the requisite bachelor's degree for students seeking health profession degrees, or graduate degrees in the basic and clinical sciences.

Both the expressed intent of the degree and the proposed curriculum demonstrate its potential value for students interested in pursuing graduate health profession degrees housed within the College of Public Health (COPH). The curriculum contains graduate prerequisites consistent with the requirements for application to a variety of programs in our College and we would be delighted to help train these students at COPH.

Completion of the program at UNMC will ensure undergraduate students have the unique opportunity to work with world renowned scientists throughout the colleges and institutes at UNMC and will expose students to a variety of biomedical research and health profession options for continued study, should they so choose. I strongly support your efforts to establish this exciting new program.

Sincerely,

A handwritten signature in black ink that reads "Ali S Khan".

Ali S Khan, MD, MPH, MBA  
Dean & Professor of Epidemiology  
Richard Holland Presidential Chair of Public Health



December 8, 2023

Jeffery D. Hoffman, DPE  
Dean of Health & Public Services  
Northeast Community College  
801 East Benjamin Avenue  
Norfolk, NE 68701  
jhoffma3@northeast.edu  
402.844.7748

Donald Klepser, PhD, MBA  
Senior Associate Dean for Academic Affairs  
University of Nebraska Center  
College of Pharmacy

Dear Dr. Klepser,

I am writing this letter in enthusiastic support for your proposal to develop a UNMC undergraduate pharmaceutical science program. As Dean of Health & Public Services at Northeast Community College, I believe this program will meet the rising demand for skilled professionals in the pharmaceutical industry and contribute significantly to advancements in the field.

This undergraduate program would be a unique and valuable opportunity to serve as a bridge for our students to access high-quality education and contribute to the advancements in pharmaceutical sciences. I believe this initiative will create an efficient pathway to an in-demand undergraduate degree, while satisfying the pre-requisites for a number of health professions and graduate programs.

Therefore, I strongly support your efforts to establish this exciting new undergraduate program.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffery D. Hoffman", with a long horizontal flourish extending to the right.

Dr. Jeffery D. Hoffman



11-Dec-2023

RE: Letter of support\* to offer BS degree course in Pharmaceutical Sciences at UNMC

Dear Sir or Madam:

I am an alumnus of Pharmaceutical Sciences Graduate Program at UNMC and graduated with PhD degree in Y2002. Prior to joining UNMC, I studied Bachelor of Pharmacy (B.Pharm) and Master of Pharmacy (M.Pharm) in Pharmaceutical Sciences from a University in India. Since 2002, I have been working at Novartis Pharmaceuticals, a multi-national pharmaceutical company, with focus on Drug Development. All these years in various roles at Novartis, I have been collaborating with associates in various other disciplines such as Research, Commercial and Medical Affairs functions. It has brought to my attention that the UNMC is considering offering BS (4-year) undergraduate degree course with pharmaceutical sciences as specialization, and I am writing this letter in support of that effort.

In the US, the training in pharmacy practice or pharmaceutical sciences w/orientation for research, development and commercial service is primarily provided as graduate class programs (Pharm D; MS or PhD or MBA). The talent pipeline to these programs is typically come from regular BS- programs with focus on life sciences, chemistry, pre-medicine or similar areas. Majority of the MS level graduate students focus their learning in a specific field such as medicinal chemistry, pharmaceuticals, drug delivery, etc; while the PhD students further specialized in respective areas with more emphasis on experiments, research methodology, data analysis/review and presentation. Therefore, both MS and PhD students do not develop a comprehensive understanding of the drug, drug product and associated areas such as integrated pharmacology, formulation development, industrial pharmacy, clinical research etc unless they are specialized as part of graduate training. In the case of Pharm D, the focus is primarily on pharmacy practice, pharmacy administration which is around retail/hospital/clinical and health economics perspective and through fellowship programs, the Pharm D talent develops next level of specialization customized to Industry or regulatory agencies or specialized clinical setting services. To this end, the point is that there are no group of students who could gain comprehensive basics of pharmaceutical sciences early in their learning journey and who could then choose specialization in the above mentioned primary pharmaceutical sciences or pharmacy practice oriented graduate programs. This is an important need in the community as this group of students can get to other fields to utilize their pharmaceutical sciences knowledge in the areas of MBA, Public Health, basic research areas (Mol Biology, biochemistry, oncology etc) in addition to the above-mentioned graduate programs.

From the pharmaceutical industry perspective, I also fully support the proposed BS program in pharmaceutical sciences for the following reasons:

- The discipline of pharmaceutical sciences has more interfaces compared to any other healthcare science program due to the core functional areas revolve around drug discovery, drug development (inc clinical research), drug commercialization/access and drug manufacturing/ distribution/supply-channels. These areas interface with basic sciences like biology, biochemistry, chemistry; integrated aspects like physical pharmacy/industrial

pharmacy, dosage forms etc; and areas like patent/legal, business management etc. A successful pharmaceutical industrial scientist/business associate in any specialization should have basics of knowledge at all these interfaces. Thus, a BS pharm sciences student would have a better learning ability at PharmD/MS/PhD/MBA/MPH like areas because of their ability to navigate effectively at the interfaces.

- The therapeutics of treating patients have been evolving with lots of emerging technologies from biology side such as cell/gene therapies and from computational side such as data analytics/artificial intelligence. Irrespective of nature of therapy, the knowledge holders of drug activity/action should be able to represent the pharmaceutical product and connect all the experts in basic fields, which is possible with students gaining alphabets and grammar of pharmaceutical sciences in their undergraduate curriculum.
- Just with the degree of BS in pharm sci, the students can explore career in marketing, sales, legal/pricing domain with or without higher education.

In summary, representing the pharmaceutical industry, I full support the proposed BS in pharmaceutical sciences curriculum at UNMC. While it is difficult to share several dimensions of perspective through this letter, I am open to address questions the committee may have over a phone call or in-person meeting.

(\*Disclaimer: the perspectives presented in this letter are personal opinions and do not represent Novartis practices or policies)

Best Regards,

Dr. Gangadhar Sunkara



February 16, 2024

College of Pharmacy  
University of Nebraska Medical Center  
986120 Nebraska Medical Center  
Omaha, NE 68198-6120

Dear Dr. Donald Klepser:

Following extensive discussion with UNO's Office of Academic Affairs and Division of Institutional Effectiveness and Student Success, I am pleased to submit this letter of support for the UNMC College of Pharmacy's proposal for the Bachelor of Science in Pharmaceutical Sciences (BSPS).

While the proposed program's curriculum is very similar to UNO's current BSPS program, it is our understanding that UNMC's new program will have more capacity than our degree program. UNO's BSPS program began recruiting majors in fall 2022, and we currently have a small, but growing, number of majors (~15). The program provides a strong foundation in chemistry as well as research experiences with UNMC College of Pharmacy or UNO Department of Chemistry faculty. Students graduating from UNO's BSPS program will continue to have unique qualifications due to this training.

As written, the UNMC proposal focuses on recruiting students from UNK, UNO and UNL, but strategically leverages UNMC's existing relationship with UNK. While the degree program might attract students from UNO's BSPS program, it is unlikely to draw many as our students will have a distinct career path.

We look forward to this and future collaborations with UNMC.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mel. Bloom'.

Melanie Bloom, Ph.D.  
Dean  
College of Arts and Sciences

Cc. Dr. Phil He, Senior Vice Chancellor for Academic Affairs  
Dr. Rich Klein, Vice Chancellor of of Institutional Effectiveness and Student Success