PHYSICIAN ASSISTANT (PHAS)

Courses

PHAS 5000. Physician Assistant Policy and Practice. 2 Credit Hours.
This course will provide the student with an overview of the assistant physician profession. The course will provide the student with an opportunity to develop an understanding of the profession to include history, social and policy issues, medical ethics, liability, educational philosophy, certification/licensure requirements, and professional concepts/issues, including a team approach to health care. Discussion will include intellectual honesty, academic and professional conduct.

PHAS 5001. Patient Evaluation 1. 2 Credit Hours.
This course provides the student with an opportunity to develop a theoretical and clinical basis for assessment of the patient. The process, in which a physician assistant utilizes a comprehensive physical, psychosocial, and cultural assessment across the lifespan to gather specific data relevant to common health problems, is demonstrated. Faculty will facilitate laboratory and clinical experiences that will focus on assessment of patients and presentation of findings in a variety of settings.

PHAS 5003. Behavioral Medicine. 1 Credit Hour.
This course provides the student with an opportunity to develop an understanding of human behavior by providing an overview of major behavioral disease processes and differentiation criteria to include disease presentation, physical examination findings, laboratory testing, and therapeutic approaches. Open for Cross Enrollment on Space Available Basis.

PHAS 5004. Clinical Applications. 4 Credit Hours.
This course provides the student with an opportunity to experience clinical practice and further develop an appreciation for the art and science of medicine as it relates to physician assistant practice. The student will have an opportunity to apply those skills taught in Patient Evaluation 1 including physical examination, medical history, patient education, documentation, and medical record keeping. Faculty will facilitate laboratory and clinical experience that will focus on assessment of patients and presentation of findings in a variety of settings. Activities will range from observation to participation in patient care. Basic problem solving, group discussion, and literature review will be included. Open for Cross Enrollment on Space Available Basis.

PHAS 5005. Clinical Applications in Nutrition. 2 Credit Hours.
The student will have the opportunity to develop knowledge of the role of nutrition in healthy and disease states. Emphasis will be on nutrition as a component of patient care and treatment. Open for Cross Enrollment on Space Available Basis.

PHAS 5006. Clinical Physiology. 4 Credit Hours.
This course is designed to provide students in health professions discipline with the fundamentals of normal human physiology. The course includes concepts from cellular to system level. Topics include cellular, respiratory, cardiovascular, digestive, renal, male and female reproductive, musculoskeletal, nervous, and endocrine systems with integration of these physiologic concepts to pathologic disease processes. The course includes classroom lecture, case studies and student presentations.

PHAS 5007. Pathogenesis of Human Disease. 3 Credit Hours.
This course covers the basic principles of pathology providing the opportunity for the understanding of human disease processes. Course content includes discussion of general disease processes such as cellular degeneration, inflammation, tissue repair, chemical and physical injury, developmental disorders and neoplasia and a thorough examination of the principal diseases of the major tissues and organ systems. Upon completion of the course the student will have had the opportunity to acquire foundation knowledge of the concepts of pathophysiology applicable and required for clinical diagnosis of human diseases. Open for Cross Enrollment on Space Available Basis.

PHAS 5009. Principles of Nutrition for the Physician Assistant. 2.5 Credit Hours.
The student will have the opportunity to develop knowledge of the role of nutrition in healthy and disease states. Emphasis will be on nutrition as a component of patient care and treatment. Open for Cross Enrollment on Space Available Basis.

PHAS 5011. Principles of Ethics and Professionalism. 1 Credit Hour.
A major component of becoming a critical thinker involves understanding of professional behavior and ethical decision making that may affect others, particularly patients and their families. This course will encourage discussion and analysis of issues that involve professional behavior and ethical conflicts to help PA students prepare for approaching ethical dilemmas. In addition, the course will address ethical issues relating to research.

PHAS 5033. Clinical Medicine 1. 10 Credit Hours.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special topics will include pediatric and geriatric applications. The organ systems to be covered are genetics, dermatology, renal/male reproductive, cardiovascular, respiratory, and hematologic.

PHAS 5034. Clinical Medicine 2. 10 Credit Hours.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special topics will include pediatric and geriatric applications. The organ systems to be covered are gastrointestinal, musculoskeletal, neurologic female reproductive, endocrine, and special topics.

PHAS 5035. Clinical Medicine for PA 1. 3 Credit Hours.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special topics will include pediatric and geriatric applications. The organ systems to be covered are genetics, ophthalmology, otolaryngology and dermatology.
PHAS 5036. Clinical Medicine for PA 2. 5 Credit Hours.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special topics will include pediatric and geriatric applications. The organ systems to be covered are: cardiology with EKG, and pulmonology.

PHAS 5037. Clinical Medicine for PA 3. 10 Credit Hours.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special topics will include pediatric and geriatric applications. The organ systems to be covered are: neurology, musculoskeletal, rheumatology, gastrointestinal, infectious disease, obstetrics, gynecology, and endocrinology.

PHAS 5038. Clinical Medicine for PA 4. 2 Credit Hours.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special topics will include pediatric and geriatric applications. The organ systems to be covered are nephrology, urology, hematology, and oncology.

PHAS 5043. Physiology in Health and Disease. 4 Credit Hours.
This course shall provide students with the opportunity to develop a knowledge base of human physiology in health and diseased states. Emphasis will be on the pathophysiology of human disease processes. Course content includes organ system physiology and general disease processes of degeneration, inflammation, neoplasia, and changes associated with major tissue/organ diseases.

PHAS 5044. Clinical Anatomy. 5 Credit Hours.
This course uses lecture and laboratory experience to learn gross morphology of the human body including: structural relationships, anatomical variations and radiological correlations. The course will emphasize the application of this anatomical knowledge to clinical practice. Students will conduct a complete cadaver gross dissection in order to reveal the anatomical basis for performing clinical procedures, conduct a physical exam, and assess structures that may be injured or diseased based on a patient presentation. Students are expected to become skilled at identification of anatomical structures, and are also expected to become proficient at recognition of structural arrangements and structural relationships. Students have the opportunity to further their knowledge of anatomy by using computer-assisted technology, which is available online. Course Fees: Admin Fee/Materials: $831 Lab/ Gross Anatomy: $30.

PHAS 5091. Special Topics. 1-10 Credit Hours.
This special topics or directed study course is a faculty-directed, didactic opportunity for students. Specific course objectives and study plans will be developed based on student needs and faculty decisions. The course may be used for special projects, additional coursework, or remedial education. It may be repeated for credit.

PHAS 5201. Patient Evaluation 2. 2 Credit Hours.
This course is a continuation of Patient Evaluation 1, and provides the student with additional opportunities to develop a theoretical and clinical basis for assessment of the patient. The process, in which a physician assistant utilizes a comprehensive physical, psychosocial, and cultural assessment across the lifespan to gather specific data relevant to common health problems, is demonstrated. Faculty will facilitate laboratory and clinical experiences that will focus on assessment of patients and presentation of findings in a variety of settings.

PHAS 5301. Patient Evaluation 3. 2 Credit Hours.
This course is a continuation of Patient Evaluation 2, and provides the student with additional opportunities to develop a theoretical and clinical basis for assessment of the patient. The process, in which a physician assistant utilizes a comprehensive physical, psychosocial, and cultural assessment across the lifespan to gather specific data relevant to common health problems, is demonstrated. Faculty will facilitate laboratory and clinical experiences that will focus on assessment of patients and presentation of findings in a variety of settings.

PHAS 6004. Preventative Medicine and Public Health. 4 Credit Hours.
The student will have an opportunity to develop an understanding and knowledge of epidemiology and preventive medicine across a number of topics. An introduction to public health, with an emphasis on needs assessment and project development, is a major component of this course. Open for Cross Enrollment on Space Available Basis.

PHAS 6010. Pharmacology 1. 3 Credit Hours.
The student will have an opportunity to develop an understanding and knowledge of the pharmacological basis of therapeutics with special emphasis on the biochemical and physiological functions in disease. Majors areas covered include drugs active in the cardiovascular, autonomic, and central nervous systems. General principles of drug action and specific coverage of drugs used in the treatment of bacterial, viral, and parasitic diseases are provided.

PHAS 6013. Clinical Research and Evidence Based Medicine. 3 Credit Hours.
This course is a general introduction to research design, statistical reasoning, and interpretation of medical/scientific literature. Topics include scientific method, theory, development of research questions, issues of measurement, models of experimental and non-experimental designs, and an overview of parametric and non-parametric statistical techniques. All topics will be in reference to understanding the literature and to evidence for practice decisions. The learner will have an opportunity to critically analyze medical and scientific literature/ research and participate in a research project headed by faculty mentors.

PHAS 6014. Pharmacology 2. 3 Credit Hours.
A continuation of Pharmacology 1, the student will have an opportunity to develop an understanding and knowledge of the actions and therapeutic uses of drugs. The topics include principles of pharmacology and pharmacokinetics. Topics will center on drug action, autonomic and cardiovascular pharmacology, neuropharmacology, endocrine pharmacology, GI and respiratory pharmacology, and an introduction to chemotherapy and toxicology. Special topics will include basics in prescription writing.
PHAS 6015. Clinical Skills. 2.5 Credit Hours.
This course provides the student with an opportunity to experience multiple aspects of clinical practice and procedure skills to further develop an appreciation for the art and science of medicine as it relates to physician assistant practice. The student will have an opportunity to apply those skills taught in lecture to lab practicums and outside clinical experience during the clinical phase of their studies. Faculty will facilitate laboratory experience that will focus on demonstration and performance based training. Activities will range from observation to participation in procedure skills. Course Fees: Clinical fee $300.00.

PHAS 6101. Internal Medicine Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice (SCP) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCP experiences enable students to meet program expectations, and acquire the competencies needed for entry level clinical PA practice. This outpatient primary care rotation will include preventive, acute and chronic patient encounters that include women's health and care across the life span.

PHAS 6102. Family Medicine Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice (SCP) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCP experiences enable students to meet program expectations, and acquire the competencies needed for entry level clinical PA practice. This outpatient primary care rotation will include preventive, acute and chronic patient encounters that include women's health and care across the life span.

PHAS 6103. Primary Care Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation course is part of a series of supervised clinical practice (SCP) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCP experiences enable students to meet program expectations, and acquire the competencies needed for entry level clinical PA practice. This outpatient primary care rotation will include preventive, acute and chronic patient encounters that include women's health and care across the life span.

PHAS 6104. Pediatrics Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice (SCP) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCP experiences enable students to meet program expectations and acquire the competencies needed for entry-level clinical PA practice. Students will encounter the types of patients essential to preparing them for entry into practice. The outpatient pediatrics rotation will include preventive, acute and chronic patient encounters.

PHAS 6105. Emergency Medicine Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation course is part of a series of supervised clinical practice (SCP) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SPC experiences enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. Students will encounter the types of patients essential to preparing them for entry into practice. This emergency medical rotation will include acute and emergent patient encounters that include women's health and care across the life span.

PHAS 6106. Inpatient Medicine Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation course is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This inpatient rotation will include preventative, acute and emergent patient encounters that include pre- and post- surgical care, women's health and care across the life span.

PHAS 6107. Women's Health Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations and acquire the competencies needed for entry-level clinical PA practice. This women's health rotation will include preventative, acute, chronic and emergent patient encounters across the life span.

PHAS 6108. General Surgery Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations and acquire the competencies needed for entry-level clinical PA practice. This general surgery rotation will include acute, chronic and emergent patient encounters that include pre-surgical, post-surgical and intra-surgical care, as well as women's health and care across the life span.

PHAS 6109. Behavioral Medicine Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This psychiatry rotation will include preventative, acute, chronic, and emergent patient encounters that include women's health and care across the life span.

PHAS 6110. Supervised Clinical Research Experience. 4 Credit Hours.
This clinical phase rotation course is a supervised research month opportunity for students who have completed the didactic phase of the Physician Assistant curriculum. This course is designed to provide practical application of skills learned during PHAS 6013 Scientific Inquiry. During this rotation, students will have the opportunity to explore research design, statistical reasoning, and interpretation of medical/scientific literature. This rotation will enhance the students' understanding and interpretation of medical literature and the application of evidence for practice decisions. The learner will have an opportunity to critically analyze medical and scientific literature/research and demonstrate the results of their team's research project headed by faculty mentors.
PHAS 6111. Elective 1 Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation course is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This elective rotation can include preventative, acute, chronic, and emergent patient encounters that include surgical care, women's health and care across the life span.

PHAS 6112. Elective 2 Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This elective rotation can include preventative, acute, chronic, and emergent patient encounters that include surgical care, women's health and care across the life span.

PHAS 6113. Elective 3 Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This elective rotation can include preventative, acute, chronic, and emergent patient encounters that include surgical care, women's health and care across the life span.

PHAS 6114. Elective 4 Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This elective rotation can include preventative, acute, chronic, and emergent patient encounters that include surgical care, women's health and care across the life span.

PHAS 6115. Elective 5 Supervised Clinical Practice Experience. 4 Credit Hours.
This clinical rotation is part of a series of supervised clinical practice experience (SCPE) opportunities for students who have completed the didactic phase of the Physician Assistant curriculum. SCPEs enable students to meet program expectations, and acquire the competencies needed for entry-level clinical PA practice. This elective rotation can include preventative, acute, chronic, and emergent patient encounters that include surgical care, women's health and care across the life span.

PHAS 6120. Endocrinology. 1.5 Credit Hour.
This course provides students with aspects of medical care related to the endocrine system. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6121. Gastroenterology. 2 Credit Hours.
This course provides students with aspects of medical care related to the gastroenterology system. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6122. Orthopedics-Rheumatology. 2 Credit Hours.
This course provides students with aspects of medical care related to the musculoskeletal system. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6123. Infectious Disease. 1 Credit Hour.
This course provides students with aspects of medical care related to infectious diseases. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6124. Women's Health. 1.5 Credit Hour.
This course provides students with aspects of medical care related to the women's health. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6125. Emergency Medicine. 1.5 Credit Hour.
This course provides students with the practical aspects of assessment, diagnosis, and management of many commonly encountered medical and surgical emergencies, the basis to identify when a patient's medical situation represents a medical emergency, the medical approaches a patient in an Emergency Department, and how to create emergent differential diagnoses. The materials will include the initial assessment of the medical and trauma patients, review of signs and symptoms and accompanying physical findings, methods of diagnosis, and treatment of a spectrum of emergent illnesses and injuries. The course will be organized by chief complaint and will cover the pertinent diseases processes/injuries to aid in the creation of learners’ differential diagnoses.

PHAS 6126. General Surgery. 1.5 Credit Hour.
This didactic phase course covers various topics concerning general surgical care of patients. Emphasis is given to presenting signs and symptoms, laboratory and imaging interpretation and the diagnosis and treatment of selected surgical disorders.

PHAS 6127. Gerontology. 1 Credit Hour.
This course provides students with all aspects of medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. The organ systems will be covered as they relate to specific geriatric patients: cardiovascular, dermatologic, otorhinolaryngology, endocrine, gastrointestinal/nutritional, hematologic, musculoskeletal, infectious disease, neurologic, psychiatric, pulmonary, and genitourinary/reproductive.
PHAS 6128. Pediatrics. 1 Credit Hour.
This course provides students with all aspects of pediatric medical care based on an organ system approach. It will provide students with an opportunity to develop an understanding of common pediatric disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included. Special emphasis is placed on childhood growth and development focusing on expected developmental milestones.

PHAS 6129. Hematology-Oncology. 0.5 Credit Hours.
This course provides students with aspects of medical care related to hematology and oncology. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6130. Renal-Genitourinary. 1.5 Credit Hour.
This course provides students with aspects of medical care related to the renal and genitourinary systems. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6131. Clinical Skills 1. 0.5 Credit Hours.
This course provides the student with knowledge and skills necessary to perform selected clinical procedures using accepted sterile techniques. The student will have the opportunity to demonstrate an understanding of the indications, contraindications, rationale and potential complications with additional emphasis on patient preparation, required materials, aseptic technique, procedure steps, wound care, patient safety and education. Faculty will facilitate lecture and laboratory experience that will focus on demonstration and performance based training. Activities will range from observation to participation in procedure skills utilized during the clinical phase of their studies.

PHAS 6132. Clinical Skills 3. 1 Credit Hour.
This course is a continuation of Clinical Skills 2, and provides the student with additional knowledge and skills necessary to perform selected clinical procedures using accepted sterile techniques. The student will have the opportunity to demonstrate an understanding of the indications, contraindications, rationale and potential complications with additional emphasis on patient preparation, required materials, aseptic technique, procedure steps, wound care, patient safety and education. Faculty will facilitate lecture and laboratory experience that will focus on demonstration and performance based training. Activities will range from observation to participation in procedure skills utilized during the clinical phase of their studies.

PHAS 6133. Cardiology. 3.5 Credit Hours.
This course provides students with all aspects of medical care related to selected cardiovascular disorders. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included.

PHAS 6134. Pulmonology. 2 Credit Hours.
This course provides students with all aspects of medical care related to selected pulmonary disorders. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Health disparities will be included.

PHAS 6135. Dermatology. 1 Credit Hour.
This course provides students with aspects of medical care related to dermatology. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6136. Otolaryngology. 1.5 Credit Hour.
This course provides students with aspects of medical care related to the otolaryngology related organ systems. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.

PHAS 6137. Clinical Skills 2. 1 Credit Hour.
This course is a continuation of Clinical Skills 1, and provides the student with additional knowledge and skills necessary to perform selected clinical procedures using accepted sterile techniques. The student will have the opportunity to demonstrate an understanding of the indications, contraindications, rationale and potential complications with additional emphasis on patient preparation, required materials, aseptic technique, procedure steps, wound care, patient safety and education. Faculty will facilitate lecture and laboratory experience that will focus on demonstration and performance based training. Activities will range from observation to participation in procedure skills utilized during the clinical phase of their studies.

PHAS 6138. Neurology. 1.5 Credit Hour.
This course provides students with aspects of medical care related to the neurologic system. It will provide students with an opportunity to develop an understanding of human disease states. Instruction will include recognition of disease state through data collection, assessment, management, patient education, and disease prevention. Instruction in health disparities and diverse populations is included.