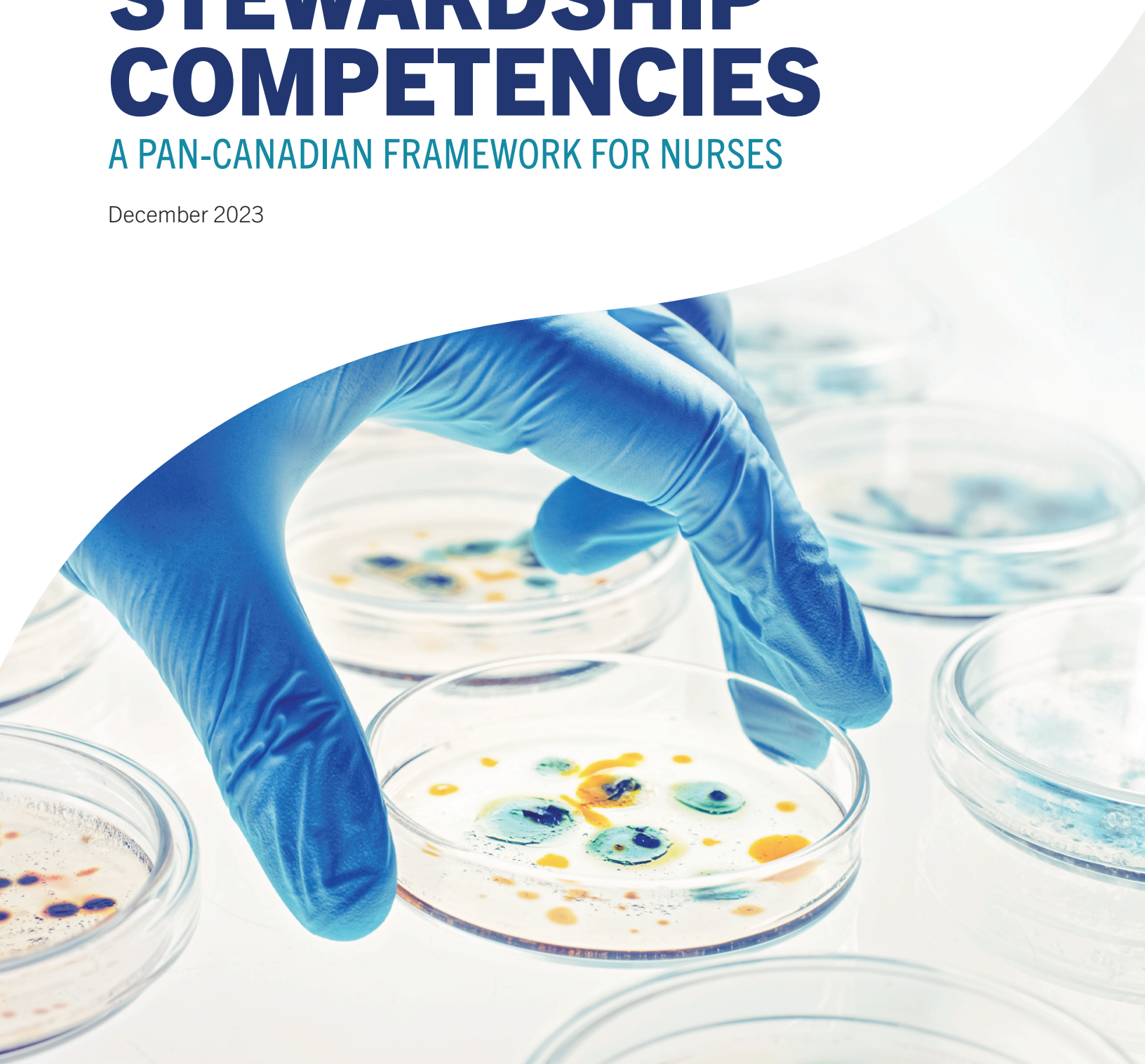
Canadian Nurses Association

ANTIMICROBIAL STEWARDSHIP COMPETENCIES

A PAN-CANADIAN FRAMEWORK FOR NURSES

December 2023



CNA is the national and global professional voice of Canadian nursing. Our mission is to advance the nursing profession to improve health outcomes in Canada's publicly funded, not-for-profit health system. CNA is the only national association that speaks for all types of nurses across all 13 provinces and territories. We represent nurses that are unionized and non-unionized, retired nurses, nursing students, and all categories of nurses (registered nurses, nurse practitioners, licensed and registered practical nurses, and registered psychiatric nurses).

ISBN 978-1-55119-468-4

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Contents

Forward

It is with great enthusiasm that I introduce *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses*, a pivotal initiative by the Canadian Nurses Association (CNA). In response to the escalating global threat of antimicrobial resistance (AMR), this framework serves as a guidance document for nurses nationwide.

Recent evidence highlights the critical roles nurses play in antimicrobial stewardship (AMS). From diagnosing and prescribing to managing drug interactions and collaborating with other disciplines, nurses contribute significantly. However, acknowledging the existing knowledge gaps and the lack of confidence in leading AMS interventions, our framework addresses these challenges.

AMS competencies involve a combination of skills, knowledge, attitudes and technical abilities that reinforce safe nursing practices in managing patients undergoing antimicrobial therapy. The proposed competencies for all nurses in all practice settings draw inspiration from the World Health Organization's *Competency Framework for Health Workers' Education and Training on Antimicrobial Resistance*, CNA's *Framework for Registered Nurse Prescribing in Canada* and the Public Health Agency of Canada's *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*.

Competency development is central to our initiative, providing a pertinent foundation for optimizing AMS-related nursing interventions. These competencies align with global standards and are tailored to the Canadian context, aiming to make a significant contribution toward reducing AMR across the country.

As nurses play a crucial role in patient care, this framework not only addresses existing challenges but also propels nursing practice toward a future where nurses are empowered, educated and integral to the global fight against AMR.

Sincerely,

Tim Guest, RN, BScN, MBA
CEO
Canadian Nurses Association

Acknowledgements

The development of the *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses (AMS Competency Framework)* was coordinated by the Canadian Nurses Association (CNA) in partnership with the Public Health Agency of Canada (PHAC), which provided funding and support to the project.

CNA gratefully acknowledges the expertise, dedication and contribution of the members of the AMS competencies for nurses steering committee and the subject matter expert working group:

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CNA would also like to acknowledge the valuable contribution of the nurses across various Canadian practice settings and roles who provided input and insights into the development of the *AMS Competency Framework* by responding to the online AMS survey, participating in one of the AMS focus groups or acting as an external reviewer of the draft framework.

Introduction

Antimicrobial resistant infections are becoming more common and increasingly difficult to treat. As a result, antimicrobial resistance (AMR) is a significant and growing threat to human, animal and environmental health in Canada and across the globe (PHAC, 2023; World Health Organization, 2018).

Antimicrobial stewardship (AMS) is a system-wide approach that recognizes the role of individuals seeking care/services, professionals, prescribers and the public in appropriate antimicrobial use. It includes coordinated interventions designed to promote, improve, monitor and evaluate appropriate antimicrobial use to preserve antimicrobial effectiveness while promoting and protecting health (PHAC, 2023).

To increase the understanding and application of AMS approaches among health professionals and prescribers, the *Pan-Canadian Framework for Action on Antimicrobial Resistance and Antimicrobial Use* (PHAC, 2023) emphasizes that the principles pertaining to AMR and appropriate antimicrobial use should consistently be made a core component of professional education and continuing competency development.

Nurses and nurse prescribers are well positioned across the health-care system to make a positive impact on AMR and promote AMS best practices. To support nurses' role and involvement in AMS across Canada, the *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses* (*AMS Competency Framework*) aims to define the knowledge, skills and attitudes required by nurses to effectively promote and participate in AMS within their practice setting and role.

Method of Development

The development of the *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses (AMS Competency Framework)* evolved through a combination of knowledge development (informed via review of the academic and grey literature, a survey and focus groups) and validation processes.

Knowledge Development

An initial rapid review of the literature was conducted by PHAC in 2020 with the goal of describing the AMS role of nurses and nurse prescribers who work in long-term care settings, as well as to identify enablers, barriers and opportunities for nurse involvement in AMS within the Canadian context. Due to pandemic-related delays, the project was relaunched in the fall of 2022 and an expanded literature review was conducted at that time to include all nursing practice settings.

Based on proposed nursing competencies and potential barriers and facilitators identified in the literature reviews, an online cross-Canada survey of nurses was conducted between June and July 2023 to confirm alignment of findings within the literature with the Canadian nursing practice context. A total of 261 nurses completed the survey; 94% reported practising within a non-prescribing role and 6% identified as a nurse prescriber.

Key findings and trends arising from the survey were confirmed and explored in further depth through three virtual focus groups with nurses (two focus groups with nine participants in total) and nurse prescribers (one focus group with five participants) that occurred in June to July 2023.

A total of 261 nurses completed the survey; 94% reported practising within a non-prescribing role and 6% identified as a nurse prescriber.

Development of the AMS Competency Framework

Findings from the literature reviews, survey and focus groups were then used to inform an initial draft of the *AMS Competency Framework* with overarching competency domains and descriptors and the specific AMS knowledge, skills and attitudes pertaining to each competency area. The draft framework underwent an internal review and validation with the subject matter expert working group,

and a revised version was appraised and approved by the steering committee prior to proceeding to an external review.

The external review and validation were conducted by a Delphi process. Preferred reviewer criteria and a listing of practice settings/roles were developed. A call for external reviewers was circulated electronically to key nursing groups and diverse geographical locations across Canada to recruit a broad representation of nursing roles and practice settings. Volunteers who came forward were screened, and if they met the reviewer criteria, an electronic copy of the draft *AMS Competency Framework*, along with a link to an online feedback form, was forwarded. Reviewers were provided with a four-week time frame to complete the review and submit anonymous feedback via the online form.

A mixed qualitative and quantitative approach to the Delphi process was used. Reviewers were asked to respond to open-text questions pertaining to the design and presentation of the overall framework (i.e., Are the competencies applicable across all nursing practice settings and roles? Is anything unclear? Is anything missing and should be added?). Reviewers were also asked to rate each individual competency statement as to whether it was applicable to include in the framework (Yes/No/Unsure) and to provide any specific suggestions for changes to the competency statement if indicated.

Thirty-three reviewers external to the project participated in the Delphi process. Participants included nurses and nurse prescribers from a range of geographical areas across Canada (including urban, rural and remote locations), clinical practice settings (community: primary care, clinics, public health; long-term and transitional care; acute care: medicine, surgery, critical/emergency care; wound care; occupational/workplace health, correctional) and nursing roles (direct care, infection prevention and control, managerial, administration/leadership, best practice, education and academia).

There was a high level of agreement (all but three statements scored greater than 90% agreement) to include the specific competency statements in the framework. Qualitative (reviewer comments) and quantitative feedback was reviewed and incorporated into a revised draft for validation by the subject matter expert working group. A final draft was then presented to the steering committee for review and approval prior to formatting and translation of the *AMS Competency Framework* document.

Volunteers who came forward were screened, and if they met the reviewer criteria, an electronic copy of the draft *AMS Competency Framework*, along with a link to an online feedback form, was forwarded. Reviewers were provided with a four-week time frame to complete the review and submit anonymous feedback via the online form.

Development of the AMS Competency Evaluation Framework

The development of the evaluation framework evolved concurrently with the development of the *AMS Competency Framework* and was based upon a review of relevant literature and exemplar documents. A draft evaluation framework was reviewed by the subject matter expert working group, and a final draft was presented to the steering committee for approval to include in the *AMS Competency Framework* document.

Assumptions

Several assumptions underpin the *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses (AMS Competency Framework)*:

- The competencies should reflect and encompass the impact of nurses' role in AMS across the breadth and range of practice settings and individuals and populations served/supported.
- Strong, overarching AMS competency domains and descriptors should be formulated, with the intent to last over an extended period.
- Specific competency statements under each domain that identify the detailed AMS knowledge, skills and attitudes are dynamic, developmental and evolutionary and should be re-evaluated at regular intervals as knowledge advances in the field of AMS.
- Competency statements should be measurable and observable to facilitate evaluation or achievement of the competency.
- The level of individual nurse AMS competence demonstrated is dependent on the depth and breadth of experience and opportunities for education and practice exposure.
- Nurses can engage in self-reflective practice and self-evaluation to determine individual competencies and identify strategies for professional development and learning.
- Adoption of AMS competencies may require a shift in how nurses, interprofessional team members, leaders, educators and practice environments conceptualize and embrace the role of nurses in AMS.
- Contextual/workplace factors may impact nurses' role and engagement in AMS across various settings. Examples include leadership support for inclusion of nurses in AMS initiatives, workforce factors (e.g., workload, resources), organizational/program priorities, etc.

Objectives and Application of the AMS Competency Framework

Objectives of the Framework

The *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses (AMS Competency Framework)* outlines the core competencies, which indicate the minimum knowledge, skills and attitudes that are required to support safe and effective AMS best practices within a nursing role. The ***AMS Competency Framework*** **provides foundational guidance** that can be adapted to different health-care and practice settings/roles to support the nurse and nurse prescriber role in AMS. Individuals will vary in the amount of time, types of resources and types of learning experiences needed to develop or strengthen different competencies depending on their knowledge, experience, environment and practice setting or role.

The *Competency Framework* is intended to represent foundational AMS competency expectations for nurses and nurse prescribers; however, it is acknowledged that not all of the competencies may be utilized within all nursing roles on a day-to-day basis. As an example, nurses working within an administrative or education capacity would need to have knowledge of the competencies associated with clinical assessment and documentation of infectious presentations and antimicrobial treatment but may not necessarily undertake those activities as part of their usual role responsibilities.

Application of the Framework

Individual Nurse/Nurse Prescriber

The *Competency Framework* can be used by nurses and nurse prescribers with their managers to guide conversations around role expectations and related professional development activities. The **Self-Evaluation Tool** (Appendix A) and **Self-Development Plan** (Appendix B) can be used by individual nurses and nurse prescribers to support self-reflective practice and identify learning needs and activities to support or enhance AMS competency development.

The *Competency Framework* is intended to represent foundational AMS competency expectations for nurses and nurse prescribers; however, it is acknowledged that not all of the competencies may be utilized within all nursing roles on a day-to-day basis.

System/Practice Setting

The *Competency Framework* can be utilized by (nurse) leaders in administration or best-practice advocacy roles to engage and support nurses and promote nurses' role in AMR and AMS activities and programs. The *Competency Framework* can also be used to guide entry-to-practice nurse and nurse prescriber curricula and education program development and offerings.

Structure and Key Elements of the AMS Competency Framework

The *AMS Competency Framework* is organized within a matrix of seven AMS Domains, nurse roles and the competencies (knowledge, skills, attitudes) that nurses and nurse prescribers require to actively promote and participate in antimicrobial stewardship within their practice setting and role. The competencies are broadly divided into three types: Core, Additional and Optional Competencies:

1. **Core Competencies** are the essential knowledge, skills and attitudes applicable to all regulated nurses across varied practice settings and positions.
2. **Additional Competencies** are those that are dependent upon whether the nurse practises within a non-prescribing direct care role (i.e., having direct contact with person[s] accessing health care or services and/or their carer[s]) or a nurse prescriber role. Nurses practising within these roles would be expected to meet these competencies in addition to the Core Competencies.
3. **Optional Competencies** (*italicized text in table*) are dependent upon the relevance to the practice setting, the needs of the persons/populations served and/or the availability of required resources to utilize the competency.

The competencies are broadly divided into three types:

1. Core,
2. Additional,
3. Optional.

AMS Competency Framework

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 1: Awareness of Antimicrobial Resistance (AMR) and Engagement in Antimicrobial Stewardship (AMS) **Description:** The nurse is able to demonstrate awareness and knowledge of AMR and AMS to engage in effective strategies to prevent, reduce and manage AMR.	**Knowledge:** › Describe the impact of AMR and AMS on morbidity, mortality, population health and the broader environment/ecosystem. › Identify the process of development and the main causes of AMR and the importance of appropriate antimicrobial use. › Explain the rationale for and importance of antimicrobial choice, route, dosage, interval, duration and administration in respect to AMR. › Define the nurse's role in AMR prevention and AMS strategies. › ***Optional:*** *Describe organizational/jurisdictional AMR presence, patterns and management guidelines.* **Skills:** › Explain the risks and causes of AMR and the appropriate use of antimicrobials with person(s)/carer(s), the public and interprofessional team members. › Advocate for and/or implement AMS programs and interventions within the practice setting or role. **Attitudes:** › Demonstrate accountability for their role in AMS and reducing AMR. › Demonstrate leadership in promotion and adoption of AMS practices. › Advocate for nurses' role in AMS initiatives and programs.	No additional competencies	**Knowledge:** › Identify evidence-informed indications for prophylactic, empiric and therapeutic antimicrobial treatment options. **Skills:** › Apply knowledge of evidence-informed antimicrobial choice and AMR to responsible antimicrobial prescribing practices. **Attitudes:** › Role-model appropriate prescribing of antimicrobials to the interprofessional team, person(s)/carer(s) and the public.

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 2: Infection Prevention and Control (IPAC) **Description:** The nurse is able to demonstrate the core IPAC competencies required to prevent/minimize the spread of infectious diseases and AMR.	**Knowledge:** › Describe infection prevention principles and the chain of transmission in respect to prevention of infections. › Identify the different sources of infection (e.g., where infectious agents live, such as environmental surfaces, human skin, etc.). › Describe the underlying principles and rationale for surveillance of infection and AMR. › Relate the importance of timely communication within the interprofessional team and documentation of infection signs and symptoms to support infection surveillance efforts. **Skills:** › Apply and monitor methods and strategies to prevent transmission of pathogens and infections, including routine practices and additional precautions, as necessary. › Explain the risks and benefits of immunization for vaccine-preventable diseases in relation to AMR with person(s)/carer(s) and the interprofessional team. › Provide or facilitate individual-/community-level education and interventions that target health equity and promotion and disease/infection prevention.	No additional competencies	**Knowledge:** › Identify infection risk as a factor when selecting or prescribing invasive techniques or interventions (e.g., peripheral versus central lines, intermittent versus indwelling catheterization, etc.).

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
	➢ Advocate for and facilitate access to harm reduction services and/or health promotion education, tools and resources (e.g., condoms, insect repellent, needle supplies, etc.) to prevent infections. **Attitudes:** ➢ Role-model the promotion and implementation of IPAC best practices (e.g., routine practices).		

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 3: Diagnostic Stewardship **Description:** The nurse is able to demonstrate the competencies required to facilitate appropriate use of microbiology testing.	**Knowledge:** › Describe the basic principles of mi-crobiology and the indications for microbiology testing for screening or infection identification/ management purposes. › Identify relevant infectious patho-gens from culture samples or other testing. **Skills:** › Utilize evidence-informed best-practice approaches, guidelines and protocols to support appropriate use and collection of microbiology and other testing. › Recognize and act upon microbiology testing or other results that require prompt intervention based on the practice setting and population. › Collect samples for microbiology/ other testing using best practices and appropriate technique. › Monitor culture/other testing results; discuss and document results and concerns with the prescriber/interprofessional team. **Attitudes:** › Advocate for and discuss the appropriate use of microbiology testing to the interprofessional team, person(s)/carer(s) and public.	**Knowledge:** › Describe the direct care nurses' role in the appropriate use, collection, storage, transportation and reporting of microbiology samples and test results.	**Knowledge:** › Describe the principles of utilizing organizational/ jurisdictional antibiograms in the prescribing of antimicrobial agents. **Skills:** › Utilize microbiology culture and susceptibility testing results and other assessments or tools to inform antimicrobial prescribing. **Attitudes:** › Advocate for the use of organizational/jurisdiction antibiograms or other related resources relative to the practice setting.

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 4: Appropriate Use of Antimicrobial Agents **Description:** The nurse is able to demonstrate the competencies required to facilitate safe and optimal use of antimicrobial agents and management of infections.	**Knowledge:** › Describe the basic pharmacological properties of antimicrobial agents, including potential adverse effects and common interactions. › Identify the basic mechanisms of resistance used by different microorganisms and the impact of antimicrobial use on these mechanisms. › Articulate the principles for choosing which antimicrobial agents should be utilized for specific microorganisms or infections. › Describe indications to start, delay or withhold antimicrobial therapy (e.g., urgency/severity considerations, non-treatment of colonized organisms, management of drug-resistant organisms). › Describe indications to modify or de-escalate antimicrobial therapy (e.g., reduction of treatment duration, intravenous to oral transition, broad to narrow spectrum, etc.). › Discuss appropriate and effective use of antimicrobial agents in the context of specific populations, practice settings and individual person-related factors or conditions. › Describe the difference between clinical infection, subclinical infection, acute infection and chronic infection.	**Knowledge:** › Describe the direct care nurse's role in the prevention and therapeutic management of infectious diseases. **Skills:** › Obtain and document an accurate antimicrobial/vaccine allergy history. › Perform medication reconciliation as indicated within the practice setting. › Discuss treatment and prescribing options with the prescriber(s)/interprofessional team based on standards and protocols for appropriate antimicrobial use. › Monitor and document the response to antimicrobial agents and report any adverse reactions to antimicrobials. › Prepare, administer and dispose of antimicrobials safely as per manufacturer recommendations. › ***Optional:*** *Administer/provide antimicrobials based on specific clinical protocols and/or delegation agreements.* › ***Optional:*** *Conduct post-prescription/treatment follow-up to monitor response to antimicrobial treatment; document/communicate findings to prescriber(s)/interprofessional team.*	**Knowledge:** › Describe additional pharmacological properties of antimicrobial agents, including chemical composition, mechanism of action and interactions between antimicrobial/therapeutic agents or food in relation to prescribing practices. › Describe the prescribing principles of broad- versus narrow-spectrum antibiotics. › Describe when decolonization of a resistant microorganism is recommended and effective. **Skills:** › Differentiate between infectious disease and other potential etiology responsible for clinical presentation. › Differentiate and diagnose diseases of various infectious etiology. › Differentiate between severe IgE-mediated anaphylactic history and a non-severe reaction to antimicrobials to avoid unnecessary prescribing of broad-spectrum agents. › Seek out and utilize evidence-informed knowledge and guidelines to guide appropriate use and responsible prescribing of antimicrobial agents.

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
	➢ Describe the difference between clinical infection, subclinical infection, acute infection and chronic infection. ➢ Discuss the difference between treatment failure and re-infection. ➢ Describe when proof of complete treatment/resolution of a microorganism is indicated. **Skills:** ➢ Recognize what constitutes a true antimicrobial/vaccine allergy and discuss when allergy testing may be indicated. ➢ Recognize the difference between colonization and infection. ➢ Assess, document and communicate holistic clinical assessment findings and infection symptomatology in an accurate and timely manner. ➢ Promote self-management and non-pharmacological strategies for infection management (e.g., rest, fluid intake, hygiene). ➢ Utilize current evidence-informed organizational/ jurisdictional guidelines or information or for the appropriate use of antimicrobials applicable to the person/population. **Attitudes:** ➢ Discuss the rationale for and principles of appropriate antimicrobial use with person(s)/ carer(s), the public and the interprofessional team.		

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 5: Person-Directed Care **Description:** The nurse is able to demonstrate the competencies required to engage and support the person/carer as a partner in care.	**Knowledge:** › Identify individual factors and contextual determinants of health that may impact appropriate antimicrobial use and risk of AMR. **Skills:** › Assess and discuss person/carer and public expectations or concerns of taking antimicrobials. › Recognize the need for a timely reaction to a person's positive response to antimicrobial treatment (e.g., support/encourage completion of course) or lack of response (e.g., need to adjust or discontinue antimicrobial treatment). › Educate persons/carers on recommended antimicrobial use and disposal. **Attitudes:** › Advocate for non-judgmental approaches that promote safety and person-directed care when making recommendations about infection prevention and management and antimicrobial use.	No additional competencies	**Skills:** › Utilize and advocate for person-directed safety netting prescribing strategies to promote person/carer empowerment and shared decision-making.

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 6: Interprofessional Collaborative Practice **Description:** The nurse is able to demonstrate the competencies required to collaborate with different professions to support AMS efforts.	**Knowledge:** › Describe the principles of interprofessional collaborative care and practice and its impact on AMS. › Describe the roles of other interprofessional team members in relation to AMS. › Identify organization-specific individuals or groups with infectious diseases/IPAC/AMS expertise and how to contact or engage them for support and guidance. › Describe the principles of behaviour change and how they apply to beliefs and practices about antimicrobial use and AMS. **Skills:** › Discuss with the interprofessional team AMS practices and the role nurses have in AMS. › Collaborate and advocate with prescribers/interprofessional team members in respect to appropriate antimicrobial therapy and AMS best practices. **Attitudes:** › Role-model effective AMS behaviours to colleagues. › Initiate difficult, respectful conversations with interprofessional team members and/or prescribers regarding antimicrobial prescribing practices that do not support AMS best practice.	No additional competencies	› No additional competencies

Competency Domain	Core Competencies for All Nurses (applicable to all regulated nurses across varied practice settings and roles)	Additional Competencies for Nurses (non-prescribing) in Direct Care Roles	Additional Competencies for Nurse Prescribers
Domain 7: Quality Improvement & Evidence-Informed Best Practice **Description:** The nurse is able to demonstrate the competencies required to promote evidence-informed best practice in AMS.	**Knowledge:** › Explain the nurse's role and potential contributions to evidence-informed best practices and how to apply knowledge in AMR reduction and AMS. **Skills:** › Participate in the development of quality improvement programs and initiatives for appropriate antimicrobial use. › ***Optional:*** *Promote, participate in and/or generate research aimed at strengthening the AMR and AMS evidence base.* **Attitudes:** › Engage in professional development activities and adjust practice based on evolving AMS and AMR evidence/information.	No additional competencies	No additional competencies

AMS Competency Evaluation Framework

An evaluation framework is offered to provide individual nurses and stakeholders with potential guidance and approaches to measure outcomes associated with achievement of the AMS competencies. As the impact and outcomes of the *Antimicrobial Stewardship Competencies: A Pan-Canadian Framework for Nurses* (*AMS Competency Framework*) will differ depending on an individual-level versus a system-level lens, evaluation measures and approaches should be tailored to the specific situation and goals. Thus, the evaluation framework below outlines competency evaluation outcome considerations for the individual nurse- and system-level contexts.

The **individual nurse-level competency evaluation** approaches outlined in the evaluation framework are based on Miller's (1990) pyramid and four levels of clinical competency: knows, knows how, shows and does. Evaluation outcomes will differ depending on the learner or education program objectives and will need to be developed in alignment with these priorities. An example of a competency outcome is provided for each of the four clinical competency areas below. Additionally, competency evaluation strategies are suggested based on the level of competency and where the learning occurs (i.e., academic or formal education program or clinical/practice setting).

Evaluation outcomes will differ depending on the learner or education program objectives and will need to be developed in alignment with these priorities.

To support individual nurse self-reflective practice, self-assessment and professional development, **a Self-Assessment Tool** based on the *AMS Competency Framework* and template for **a Self-Development Plan** can be found in the Appendices.

When considering **system-level evaluation** of the impact of the *AMS Competency Framework*, it is noted that effective AMR and AMS efforts require a collaborative, interprofessional, intersectoral and multipronged approach to realize broader outcomes. However, within a formal academic or education setting, a key initial outcome could be the adoption and use of the *AMS Competency Framework* within nurse and nurse prescriber education program curricula and within professional development education programs and initiatives outside of the formal education system.

In respect to system-level outcomes for the clinical program/practice setting, the impact of education and learning based on the *AMS Competency Framework* and nurses' overall contributions to AMR and AMS could be reflected within key performance indicators of relevance to the program or setting (Kirkpatrick & Kirpatrick, 2006). The evaluation framework below outlines a Structure-Process-Outcomes approach (Stemkens et al., 2023) with some examples that may provide guidance when developing key program quality indicators and benchmarks.

Individual Nurse-Level Outcomes				
Miller's (1990) Level of Clinical Competence	***AMS Competency Framework* Attribute**	**Competency Evaluation Outcome Examples**	**Evaluation Strategies**	
			Academic Setting or Education Program	**Clinical/Practice Setting**
Knows (Fact Gathering)	Knowledge	The nurse is able to describe the impact of AMR and AMS on morbidity, mortality, population health and the broader environment/ ecosystem. **(Domain 1: Knowledge)**	➤ Context-free MCQs* ➤ Research-informed written reports ➤ Interview/oral assessment	➤ Pre-/post-education knowledge assessment (context-free MCQs) ➤ Self-assessment
Knows How (Interpretation/ Application)	Knowledge	The nurse is able to identify relevant infectious pathogens from culture samples or other testing. **(Domain 2: Knowledge)**	➤ Scenario-based MCQs ➤ Essays ➤ Case presentations ➤ Interview/oral assessment	➤ Pre-/post-education knowledge assessment (scenario-based MCQs) ➤ Self-assessment
Shows (Demonstration of Learning)	Skills	The nurse is able to assess, document and communicate holistic clinical assessment findings and infection symptomatology in an accurate and timely manner. **(Domain 3: Skills)**	➤ Lab practical simulations (in person or web based) ➤ OSCEs** ➤ Video recording of performance in controlled setting with feedback	➤ Return demonstration ➤ Role-play ➤ Self-assessment ➤ Video recording of performance in controlled setting with feedback
Does (Performance Integrated into Practice)	Skills & Attitudes	The nurse is able to discuss the rationale for and principles of appro-priate antimicrobial use with person(s)/carer(s), the public and the interprofessional team. **(Domain 4: Attitudes)**	➤ Clinical practicums ➤ Video recording of performance with feedback Interviews ➤ Self-assessment	➤ Direct observation and/or video recording of performance with feedback ➤ Peer assessment ➤ Self-assessment

*Multiple-choice questions;
**Objective structured clinical examination.

System/Context-Level Outcomes			
AMS Competency Framework Attribute	**Evaluation Outcomes**	**Academic Setting or Education Program**	**Clinical/Practice Setting**
Knowledge, Skills & Attitudes	Consider impact on key performance indicators closely linked to targeted outcomes or quality indicators in the education or practice setting.	➤ Adoption/use of the *AMS Competency Framework* in undergraduate and college-l evel entry-to-practice nursing programs and nurse prescriber education programs ➤ Adoption/use of the *AMS Competency Framework* within professional development education programs and initiatives	➤ *Structure* quality indicators: indicate whether a particular facility or structure is available within the organization/program (e.g., an AMS team or local guideline) ➤ *Process* quality indicators: evaluate whether the actual care delivered is appropriate (e.g., the percentage of eligible persons who received microbiology testing and/or antimicrobial therapy per appropriate indications and established guidelines) ➤ *Outcome* quality indicators: focus on the outcomes or results of the care delivered (e.g., percentage of persons with the desired care/health outcome; prevalence and/or incidence of antimicrobial resistant organisms)

Glossary of Terms

Additional precautions: Extra measures taken when routine practices alone might not be enough to interrupt transmission of an infectious agent. They are used in addition to routine practices and can be initiated both on condition or clinical presentation (syndrome) and on specific etiology (diagnosis) (CSA, 2022).

Antimicrobial agent(s): Natural or synthetic substances that can kill or block the growth of microorganisms. These agents are usually administered parenterally (intramuscularly, intravenously) or orally or applied topically to the skin in the form of a cream or an ointment (Health Canada, 2017).

Antimicrobial resistance (AMR): The ability of microorganisms to evolve to survive and develop ways to evade antimicrobial agents (e.g., antibiotics, antivirals) (Health Canada, 2017).

Antimicrobial stewardship (AMS): How the appropriate use of antimicrobials (including antibiotics) can maximize both their current and future effectiveness. AMS embodies an organizational or system-wide approach to promoting and monitoring judicious use of antimicrobials to slow the spread of AMR and preserve their future effectiveness (WHO, 2018).

Antimicrobial use: How antimicrobials are used, including treatment goal, duration of use and route of administration (Health Canada, 2017).

Broad-spectrum antibiotics: Antibiotics that work against a wide range of bacteria (Health Canada, 2017).

Carer: The individual(s) supporting a person accessing health care or services (e.g., family member[s] or a chosen support, such as a friend/designate).

Colonization: The presence of microorganisms in or on a host, with growth and multiplication but without tissue invasion or cellular injury (PHAC, 2016).

Decolonization: The use of antimicrobials to eradicate (remove) colonization of resistant bacteria (PIDAC, 2013).

Drug-resistant organism(s): Microorganism(s) that have acquired resistance to one or more classes of antimicrobial agents (Health Canada, 2017).

Harm reduction strategies: Evidence-informed, person-directed approaches that seek to reduce the health and social harms associated with addiction and substance use, without necessarily requiring people who use substances from abstaining or stopping (CMHA, n.d.).

Infection: The entry and multiplication of an infectious agent in the tissues of the host (CSA, 2022):

- *Clinical (symptomatic) infection* is an infectious process resulting in clinical signs and symptoms (i.e., disease).
- *Subclinical (asymptomatic) infection* is an infectious process running a course similar to that of clinical disease but below the threshold of clinical symptoms.
- *Acute infection* is typically characterized by a rapid onset of symptoms and lasts for a relatively short period of time.
- *Chronic infection* is characterized by the continued presence of an infectious agent following a primary infection that may not necessarily cause acute or worsening symptoms but may still be active and may spread to others.

Infection prevention and control (IPAC): Evidence-informed practices and procedures that, when applied consistently in health-care and other settings, can prevent or reduce the risk of transmission of microorganisms (CSA, 2022).

Medication reconciliation: A structured process in which members of the interprofessional team partner with a person and/or carer to obtain a complete and up-to-date list of medications to ensure accurate and comprehensive medication information is communicated consistently across transitions of care (ISMP Canada, 2023).

Nursing competencies: Integration of the attributes (i.e., knowledge, skills, attitudes) that comprise competent and ethical nursing care, within a specific setting and context (CNA, 2015).

Person(s): Any person(s) accessing health care or services in any setting.

Person-directed care: An approach that supports a person (or the closest carer/designate dependent upon the person's willingness or ability to participate) to direct all decisions related to their care through the development of trusting relationships and partnerships in care.

Post-prescription/treatment follow-up: Planned follow-up with a person (or their carer) within a specified time after being seen by a care provider and prescribed an antimicrobial to assess the response to antimicrobial use and the need for any adjustment to the plan of care.

Routine practices: A comprehensive set of IPAC measures (e.g., hand hygiene, point-of-care risk assessment, use of personal protective equipment, cleaning and disinfection, etc.) that have been developed for use in the routine care of all persons at all times in all health-care settings with the aim of preventing or minimizing the spread of infection (CSA, 2022).

Safety netting prescribing strategies: Essential processes to help manage uncertainty in the diagnosis and management of conditions by providing information for person(s)/carer(s) and organizing follow-up contact with a health professional (e.g., follow-up culture or testing result calls/appointments, delayed prescribing, etc.) (Jones, Dunn, Watt, & Macleod, 2019).

AMS and AMR Information and Resources

Canadian Resources

Canadian Nurses Association. Anti-Microbial Resistance: https://www.cna-aiic.ca/en/policy-advocacy/advocacy-priorities/antimicrobial-resistance

IPAC Canada. Antibiotic-Resistant Organisms (AROs): https://ipac-canada.org/antibiotic-resistant-organism-resources#AMS

Public Health Agency of Canada. Antibiotic (Antimicrobial) Resistance: https://www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance.html

International Resources

International Council of Nurses: Antimicrobial resistance. https://www.icn.ch/membership/specialist-affiliates/nursing-policy/icn-strategic-priorities/antimicrobial-resistance

World Health Organization: Antimicrobial stewardship interventions: A practical guide. https://www.who.int/europe/publications/i/item/9789289056267

World Health Organization: WHO policy guidance on integrated antimicrobial stewardship activities. https://www.who.int/publications/i/item/9789240025530

Other National/Organizational Resources

American Nursing Association: Project Firstline — Antimicrobial Stewardship. https://www.nursingworld.org/practice-policy/project-firstline/on-the-go-resource/healthcare-acquired-infections/antibiotic-stewardship/

Centers for Disease Control and Prevention: Continuing Education and Informational Resources. https://www.cdc.gov/antibiotic-use/training/continuing-education.html

Johns Hopkins Medicine: Toolkit to Enhance Nursing and Antibiotic Stewardship Partnership. https://www.hopkinsmedicine.org/antimicrobial-stewardship/nursing-toolkit

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Appendices

Appendix A: Self-Evaluation Tool

This Self-Evaluation Tool is based on the *Antimicrobial Stewardship (AMS) Competency Framework for Nurses* and can be used to self-assess and reflect upon areas of strength and opportunities to build/reinforce the competencies (i.e., knowledge, skills and attitudes) required to support AMS within your current or future nursing role. Consider each competency indicator and rate your individual competence using the following criteria and descriptions:

Novice	Developing	Competent	N/A
I recognize that I have little to no experience or competency related to this indicator. I require education and/or orientation to demonstrate the knowledge, skills or attitudes associated with this competency when required within my current or future practice environment to meet the needs of the person(s)/population I serve/support.	I have some experience and/or competency related to this indicator. I intend to develop, improve or build upon areas of knowledge, skills or attitudes associated with this competency in relation to my nursing practice, the person(s)/population I serve/support and/or emerging topics/issues within my current or future practice environment.	I satisfactorily demonstrate the knowledge, skills or attitudes associated with this competency when required within my current or future practice environment to meet the needs of the person(s)/population I serve/support.	This competency is currently not part of my nursing role and/or applicable to my practice setting.

Domain 1: Awareness of Antimicrobial Resistance (AMR) and Engagement in Antimicrobial Stewardship (AMS)

Description: The nurse is able to demonstrate awareness and knowledge of AMR and AMS to engage in effective strategies to prevent, reduce and manage AMR.

Core Competencies for All Nurses

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe the impact of AMR and AMS on morbidity, mortality, population health and the broader environment/ecosystem.				
Identify the process of development and the main causes of AMR and the importance of appropriate antimicrobial use.				
Explain the rationale for and importance of antimicrobial choice, route, dosage, interval, duration and administration in respect to AMR.				
Define the nurse's role in AMR prevention and AMS strategies.				
Describe organizational/jurisdictional AMR presence, patterns and management guidelines (*optional*).				
SKILLS: I am able to...				
Explain the risks and causes of AMR and the appropriate use of antimicrobials with person(s)/carer(s), the public and interprofessional team members.				
Advocate for and/or implement AMS programs and interventions within the practice setting or role.				
ATTITUDES: I am able to...				
Demonstrate accountability for my role in AMS and reducing AMR.				
Demonstrate leadership in promotion and adoption of AMS practices.				
Advocate for nurses' role in AMS initiatives and programs.				

Domain 1: Awareness of Antimicrobial Resistance (AMR) and Engagement in Antimicrobial Stewardship (AMS)

Description: The nurse is able to demonstrate awareness and knowledge of AMR and AMS to engage in effective strategies to prevent, reduce and manage AMR.

Additional Competencies for Nurse Prescribers

(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Identify evidence-informed indications for prophylactic, empiric and therapeutic antimicrobial treatment options.				
SKILLS: I am able to...				
Apply knowledge of evidence-informed antimicrobial choice and AMR to responsible antimicrobial prescribing practices.				
ATTITUDES: I am able to...				
Role-model appropriate prescribing of antimicrobials to the interprofessional team, person(s)/carer(s) and the public.				

Domain 2: Infection Prevention and Control (IPAC)

Description: The nurse is able to demonstrate the core IPAC competencies required to prevent/minimize the spread of infectious diseases and AMR.

Core Competencies for All Nurses:

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe infection prevention principles and the chain of transmission in respect to prevention of infections.				
Identify the different sources of infection (e.g., where infectious agents live, such as environmental surfaces, human skin, etc.).				
Describe the underlying principles and rationale for surveillance of infection and AMR.				
Relate the importance of timely communication within the interprofessional team and documentation of infection signs and symptoms to support infection surveillance efforts.				

Domain 2: Infection Prevention and Control (IPAC)

Description: The nurse is able to demonstrate the core IPAC competencies required to prevent/minimize the spread of infectious diseases and AMR.

	Novice	Developing	Competent	N/A
SKILLS: I am able to...				
Apply and monitor methods and strategies to prevent transmission of pathogens and infections, including routine practices and additional precautions, as necessary.				
Explain the risks and benefits of immunization for vaccine-preventable diseases in relation to AMR with person(s)/carer(s) and the interprofessional team.				
Provide or facilitate individual-/community-level education and interventions that target health equity and promotion and disease/infection prevention.				
Advocate for and facilitate access to harm reduction services and/or health promotion education, tools and resources (e.g., condoms, insect repellent, needle supplies, etc.) to prevent infections.				
ATTITUDES: I am able to...				
Role-model the promotion and implementation of IPAC best practices (e.g., routine practices).				

Additional Competencies for Nurse Prescribers

(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Identify infection risk as a factor when selecting or prescribing invasive techniques or interventions (e.g., peripheral versus central lines, intermittent versus indwelling catheterization, etc.).				

Domain 3: Diagnostic Stewardship

Description: The nurse is able to demonstrate the competencies required to facilitate appropriate use of microbiology testing.

Core Competencies for All Nurses:

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe the basic principles of microbiology and the indications for microbiology testing for screening or infection identification/management purposes.				
Identify relevant infectious pathogens from culture samples or other testing.				
SKILLS: I am able to...				
Utilize evidence-informed best-practice approaches, guidelines and protocols to support appropriate use and collection of microbiology and other testing.				
Recognize and act upon microbiology testing or other results that require prompt intervention based on the practice setting and population.				
Collect samples for microbiology/other testing using best practices and appropriate technique.				
Monitor culture/other testing results; discuss and document results and concerns with the prescriber/ interprofessional team.				
ATTITUDES: I am able to...				
Advocate for and discuss the appropriate use of microbiology testing to the interprofessional team, person(s)/carer(s) and public.				

Additional Competencies for Nurses (non-prescribing) in Direct Care Roles

(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe the direct care nurses' role in the appropriate use, collection, storage, transportation and reporting of microbiology samples and test results.				

Domain 3: Diagnostic Stewardship

Description: The nurse is able to demonstrate the competencies required to facilitate appropriate use of microbiology testing.

Additional Competencies for Nurse Prescribers
(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe the principles of utilizing organizational/jurisdictional antibiograms in the prescribing of antimicrobial agents.				
SKILLS: I am able to...				
Utilize microbiology culture and susceptibility testing results and other assessments or tools to inform antimicrobial prescribing.				
ATTITUDES: I am able to...				
Advocate for the use of organizational/jurisdiction antibiograms or other related resources relative to the practice setting.				

Domain 4: Appropriate Use of Antimicrobial Agents

Description: The nurse is able to demonstrate the competencies required to facilitate safe and optimal use of antimicrobial agents and management of infections.

Core Competencies for All Nurses:	Novice	Developing	Competent	N/A
KNOWLEDGE*:* I am able to...				
Describe basic pharmacological properties of antimicrobial agents, including potential adverse effects and common interactions.				
Identify the basic mechanisms of resistance used by different microorganisms and the impact of antimicrobial use on these mechanisms.				
Articulate the principles for choosing which antimicrobial agents should be utilized for specific microorganisms or infections.				
Describe indications to start, delay or withhold antimicrobial therapy (e.g., urgency/severity considerations, non-treatment of colonized organisms, management of drug-resistant organisms).				
Describe indications to modify or de-escalate antimicrobial therapy (e.g., reduction of treatment duration, intravenous to oral transition, broad to narrow spectrum, etc.).				
Discuss appropriate and effective use of antimicrobial agents in the context of specific populations, practice settings and individual person-related factors or conditions.				
Describe the difference between clinical infection, subclinical infection, acute infection and chronic infection.				
Discuss the difference between treatment failure and re-infection.				
Describe when proof of effective treatment/resolution of a microorganism is indicated.				

Domain 4: Appropriate Use of Antimicrobial Agents

Description: The nurse is able to demonstrate the competencies required to facilitate safe and optimal use of antimicrobial agents and management of infections.

	Novice	Developing	Competent	N/A
SKILLS: I am able to...				
Recognize what constitutes a true antimicrobial/vaccine allergy and discuss when allergy testing may be indicated.				
Recognize the difference between colonization and infection.				
Assess, document and communicate holistic clinical assessment findings and infection symptomatology in an accurate and timely manner.				
Promote self-management and non-pharmacological strategies for infection management (e.g., rest, fluid intake, hygiene).				
Utilize current evidence-informed organizational/jurisdictional guidelines or information or for the appropriate use of antimicrobials applicable to the person/population.				
ATTITUDES: I am able to...				
Discuss the rationale for and principles of appropriate antimicrobial use with person(s)/carer(s), the public and the interprofessional team.				

Additional Competencies for Nurses (non-prescribing) in Direct Care Roles

(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe the direct care nurse's role in the prevention and therapeutic management of infectious diseases.				
SKILLS: I am able to...				
Obtain and document an accurate antimicrobial/vaccine allergy history.				
Perform medication reconciliation as indicated within the practice setting.				
Discuss treatment and prescribing options with the prescriber(s)/interprofessional team based on standards and protocols for appropriate antimicrobial use.				
Monitor and document response to antimicrobial agents and report any adverse reactions to antimicrobials.				

Domain 4: Appropriate Use of Antimicrobial Agents

Description: The nurse is able to demonstrate the competencies required to facilitate safe and optimal use of antimicrobial agents and management of infections.

	Novice	Developing	Competent	N/A
Prepare, administer and dispose of antimicrobials safely as per manufacturer recommendations.				
Administer/provide antimicrobials based on specific clinical protocols and/or delegation agreements (*optional*).				
Conduct post-prescription/treatment follow-up to monitor response to antimicrobial treatment; document/communicate findings to prescriber(s)/ interprofessional team (*optional*).				

Additional Competencies for Nurse Prescribers

(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe additional pharmacological properties of antimicrobial agents, including chemical composition, mechanism of action and interactions between antimicrobial/ therapeutic agents or food to inform prescribing practices.				
Describe the prescribing principles of broad- versus narrow-spectrum antibiotics.				
Describe when decolonization of a resistant microorganism is recommended and effective.				
SKILLS: I am able to...				
Differentiate between infectious disease and another potential etiology responsible for clinical presentation.				
Differentiate and diagnose diseases of various infectious etiology.				
Differentiate between a severe IgE-mediated anaphylactic history and a non-severe reaction to antimicrobials to avoid unnecessary prescribing of broad-spectrum agents.				
Seek out and utilize evidence-informed knowledge and guidelines to guide appropriate use and responsible prescribing of antimicrobial agents.				

Domain 5: Person-Directed Care

Description: The nurse is able to demonstrate the competencies required to engage and support the person/carer as a partner in care.

Core Competencies for All Nurses:

	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Identify individual factors and contextual determinants of health that may impact appropriate antimicrobial use and risk of AMR.				
SKILLS: I am able to...				
Assess and discuss person/carer and public expectations or concerns of taking antimicrobials.				
Recognize the need for a timely reaction to a person's positive response to antimicrobial treatment (e.g., support/encourage completion of course) or lack of response (e.g., need to adjust or discontinue antimicrobial treatment).				
Educate persons/carers on recommended antimicrobial use and disposal.				
ATTITUDES: I am able to...				
Advocate for non-judgmental approaches that promote safety and person-directed care when making recommendations about infection prevention and management and antimicrobial use.				

Additional Competencies for Nurse Prescribers

(only complete this section if applicable to your current or future role)

	Novice	Developing	Competent	N/A
SKILLS: I am able to...				
Utilize and advocate for person-directed safety netting prescribing strategies to promote person/carer empowerment and shared decision-making.				

Domain 6: Interprofessional Collaborative Practice

Description: The nurse is able to demonstrate the competencies required to collaborate with different professions to support AMS efforts.

Core Competencies for All Nurses:	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Describe the principles of interprofessional collaborative care and practice and its impact on AMS.				
Describe the roles of other interprofessional team members in relation to AMS.				
Identify organization-specific individuals or groups with infectious diseases/IPAC/AMS expertise and how to contact or engage them for support and guidance.				
Describe the principles of behaviour change and how they apply to beliefs and practices about antimicrobial use and AMS.				
SKILLS: I am able to...				
Discuss with the interprofessional team AMS practices and the role nurses have in AMS.				
Collaborate and advocate with prescribers/interprofessional team members in respect to appropriate antimicrobial therapy and AMS best practices.				
ATTITUDES: I am able to...				
Role-model effective AMS behaviours to colleagues.				
Initiate difficult, respectful conversations with interprofessional team members and/or prescribers regarding antimicrobial prescribing practices that do not support AMS best practice.				

Domain 7: Quality Improvement & Evidence-Informed Best Practice

Description: The nurse is able to demonstrate the competencies required to promote evidence-informed best practice in AMS.

Core Competencies for All Nurses:	Novice	Developing	Competent	N/A
KNOWLEDGE: I am able to...				
Explain the nurse's role and potential contributions to evidence-informed best practices and how to apply knowledge in AMR reduction and AMS.				
SKILLS: I am able to...				
Participate in the development of quality improvement programs and initiatives for appropriate antimicrobial use.				
Promote, participate in and/or generate research aimed at strengthening the AMR and AMS evidence base (*optional*).				
ATTITUDES: I am able to...				
Engage in professional development activities and adjust practice based on evolving AMS and AMR evidence/information.				

Appendix B: Self-Development Plan

Based on your self-evaluation, identify learning needs and activities to support or enhance your AMS competency development:

1. Set self-directed learning goals to enhance your nursing competency in AMS. Goals should be SMART (Specific, Measurable, Attainable, Relevant and Timely).
2. Identify learning resources, activities and evaluation strategies related to your goal(s). Examples of learning resources are available on the AMS and AMR Information and Resources page, and evaluation strategies can be found on the of AMS Competency evaluation framework section.
3. Reflect regularly upon how your learning impacted your nursing practice in respect to AMS.

Learning Goal(s)	Learning Activity(ies) to meet Goal(s)	Evaluation Strategies	Targeted Completion Date	Completion Date