كليـــــــة الطب
والصيدلة - مراكش
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Élaboration d'un Référentiel de Compétences en Anesthésie Réanimation – Development of a Dual Process Framework Outlining Proficiency in Critical Care and Anesthesiology

THESIS

PRESENTED AND PUBLICLY DEFENDED ON 21/12/2023

BY

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Born On January 5th 1998 in Tunis

TO OBTAIN THE DEGREE OF DOCTOR OF MEDICINE

KEYWORDS

Competency based medical education – Competency – Proficiency Framework – Milestones – Competency Dictionary – Assessment

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"ربِ أوزعني أن أشكر نعمتك
التي أنعمت عليَ وعلى والديَ
وأن أعمل صالحا ترضاه
وأصلح لي في ذريتي
إني تبت إليك و إني من المسلمين"
صدق الله العظيم

سورة الاحقاف الآية 15

Serment d'Hypocrates

Au moment d'être admis à devenir membre de la profession médicale, je m'engage solennellement à consacrer ma vie au service de l'humanité.

Je traiterai mes maîtres avec le respect et la reconnaissance qui leur sont dus.

Je pratiquerai ma profession avec conscience et dignité. La santé de mes malades sera mon premier but.

Je ne trahirai pas les secrets qui me seront confiés.

Je maintiendrai par tous les moyens en mon pouvoir l'honneur et les nobles traditions de la profession médicale.

Les médecins seront mes frères.

Aucune considération de religion, de nationalité, de race, aucune considération politique et sociale, ne s'interposera entre mon devoir et mon patient.

Je maintiendrai strictement le respect de la vie humaine dès sa conception.

Même sous la menace, je n'userai pas mes connaissances médicales d'une façon contraire aux lois de l'humanité.

Je m'y engage librement et sur mon honneur.

Déclaration Genève, 1948


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LISTE ARRETEE LE 04/10/2023


DEDICATIONS

اللهمّ الحمد لله الّذي بعزته وجلاله تتمّ الصالحات، يا ربّ لك الحمد كما ينبغي لجلال وجهك وعظيم سلطانك

اغفر لنا وارحمنا وارض عنا، وتقبّل منا وأدخلنا الجنة ونجنا من النّار، وأصلح لنا شأننا كله، اللهم أحسن عاقبتنا

في الأمور كلّها، وأجرنا من خزي الدّنيا وعذاب الآخرة.

اللهم ارحم والدي بجميع رحمتك، اللهم لا تجعل لهما ذنباً إلا غفرته، ولا هماً إلا فرجته، ولا حاجة من حوائج

الدنيا هي لك رضاً ولهما فيها صلاح إلا قضيتها

اللهم لا تجعل لهما حاجة عند أحد غيرك، اللهم وأقر أعينهما بما يتمنياه لنا في الدنيا اللهم اشفِ والدينا شفاءً

لا يغادر سقماً، وألبسهما لباس العافية

جازاكم الله عني خيرا ورحمة ونورا وأبقاكم تاج على رأسي من الرضا والبركة

To my dearest parents

No dedication, no words can express all the gratitude affection and love I have for you. Thank you for supporting me both morally and materially so that I could achieve my goal. May this work be the crowning achievement of your generous sacrifices, Your encouragement and patience, To you I owe my eternal gratitude, which could never be greater Your sacrifices and your prayers for me.

To my father ***FAHEM Mohamed Jaleleddine****, thank you for being my support and strength, for always putting my welfare and education first.*

To my mother ***BEN ALI Salwa****, I thank you for being my support and consolation in the face of all difficulties, your prayers accompany me and make every day easier for me.*

May this work bring you joy and pride. I pray to God, the Almighty, to protect you and give you health, happiness and long life...

To my dearest sister and her husband

To my Sister ***FAHEM Siwar****, Thank you for being the best sister and the best friend, I'll never be able to count all the happy memories we've shared together, thank you for being my moral support and my second mother. I wish you every happiness and success in your life*

To my brother-in-law Ben ***Mariem Radhouane,*** *thank you for being a man of dignity and patience and I pray that you will always preserve my sister and that you will always be a source of her happiness*

To my dear Nephew Sanad

Thank you, God, for the joy you inspire in our family. Your smile has always helped me to regain my willpower.

I pray that you will always be a source of support and pride for your parents and may God Almighty preserve you.

To my dearly beloved Rabab AMELLAL

My lovely little home away from home

As a token of my great affection. Please find in this work the expression of my esteem and my sincere attachment.

Thank you for always being in my corner for better or worse,

I pray that Almighty God to give you happiness and always keeps you by my siide.

To my grandfathers to my paternal grandmother

I wish you could have been there with me. May God have your souls in his holy mercy.

To my maternal grandmother

I thank you for all the love you have shown me since I was a child and I hope that your blessing will always be with me.

May God watch over you and grant you health and eternal happiness.

To all my aunts and uncles

I want you to know that simple words alone prove the great love and immense affection I have for you.

In memory of my Uncle FAHEM Mohamed Najib may God have your soul in his holy mercy.

To My Dear Cousins and Cousines

You are my brothers, sisters and friends.

The love and kindness you have shown me has helped me through the difficult times. Thank you for your support. May God help you to achieve your dreams and succeed in your life.

To my dearest friends

To all the times we've spent together, to all our memories! You are more than friends to me!

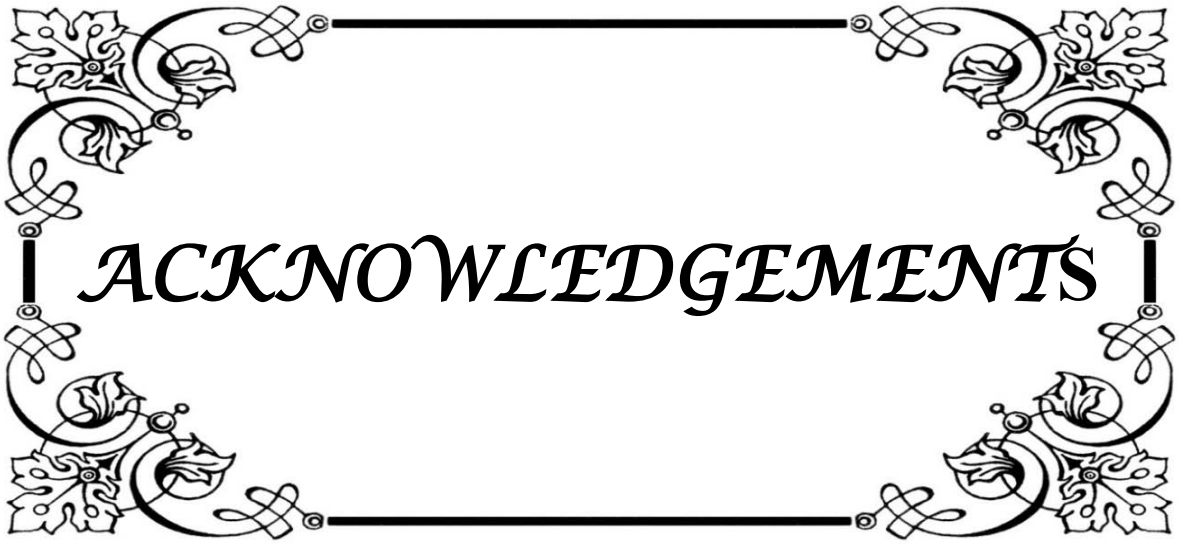
I can't find an expression to express my gratitude

And the feelings of brotherhood we share.

Thank you for all the wonderful times we've shared. I dedicate this work to you as a token of our sincere friendship, which I hope will last a lifetime.

To all those who are dear to me and whom I have unintentionally omitted to mention.

To all those who have contributed in any way to the completion of this work.


ACKNOWLEDGEMENTS

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Head of the department of Pediatrics at the University Hospital Mohammed VI

Dean of the Faculty of Medicine and Pharmacy of Marrakech, Cadi Ayyad University

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Head of department at the University Hospital Mohammed VI and Professor of Anesthesiology and Critical Care

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Head of Department of Pediatric Critical Care at the Mohammed VI University Hospital, Marrakech and Professor of Critical Care and Anesthesiology

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Head of department at the University Hospital Mohammed VI and Professor of Endocrinology and Metabolic Diseases

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Professor of Parasitology

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Former Head of Department of Emergency at the Mohammed VI University Hospital, Marrakech and Professor of Critical Care and Anesthesiology

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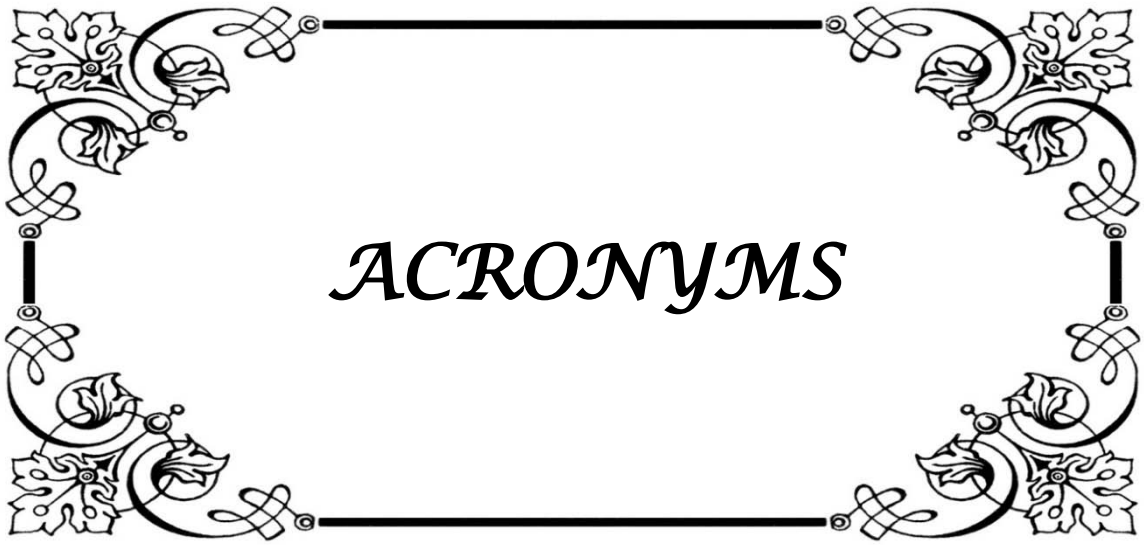
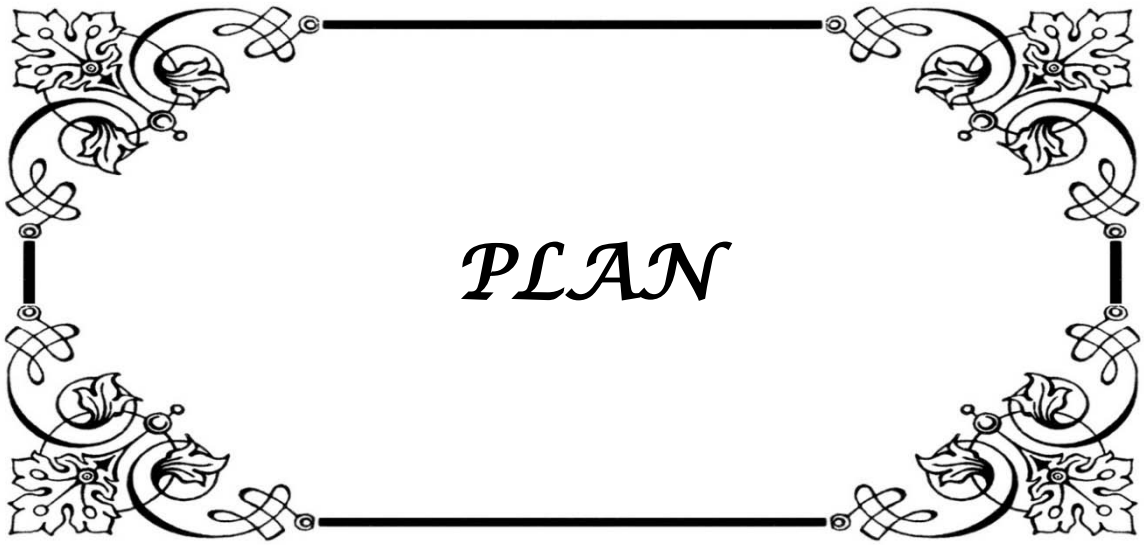
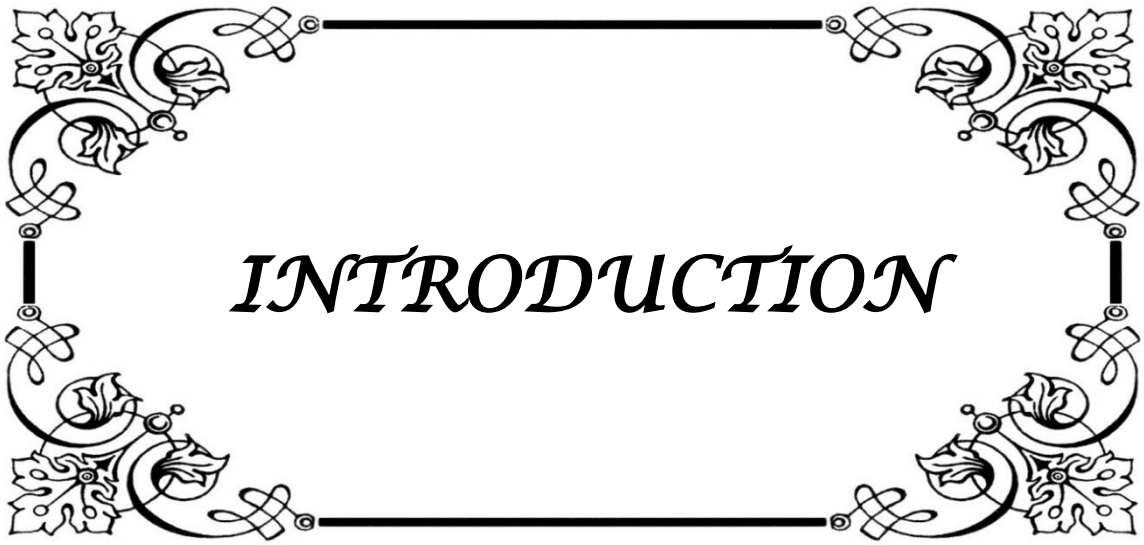

ACRONYMS

List of Acronyms

CBET	:	Competency Based Education and Training
CBE	:	Competency Based Education
CBME	:	Competency Based Medical Education
EPA	:	Entrustable Professional Activities
ACGME	:	Accreditation Council For Graduate Medical Education
CanMEDS	:	Canadian Medical Education Directions for Specialists
MBACC	:	Moroccan Board of Anesthesiology and Critical Care
SMAAR	:	Société Marocaine d'Anesthésie, d'Analgésie et de Réanimation


PLAN



INTRODUCTION

Critical Care and Anesthesiology doctors are a pillar of any professional healthcare facility. In urban and rural, teaching and nonteaching, large or small sized hospitals, Critical Care and Anesthesiology are tied to almost every aspect of care in medicine. Be that the care of acutely ill patients, anesthesia in its several forms, pain management and a deep consistent connection with emergency medical medicine, the activity Critical Care and Anesthesiology doctors often entails a position with major decision-making power, several patient safety considerations, a need for effective communication and teamwork, a high and stressful workload as well as potentially conflictual relationships with colleagues from other specialties, as perceived by their healthcare colleagues in a work by Selim J et al. 2022 (1).

This implies a significant amount of social responsibility especially as the specialty is centered on patients that are most ill or in their most vulnerable of states.

This responsibility weighs greatly on Critical Care and Anesthesiology doctors and imposes that they pursue a constant quest of proficiency.

Such a quest is a journey of years of training and practice and the commitment to proficiency must be cultivated since the early stages of residency if not earlier. This has always been the end goal of endless discussions on reform of post-graduate medical education on the world stage. All stemming from a timeless accord between educators that the education system has always room for improvement.

These discussions are decades long, dating all the way back to the design of modern medical education a century ago by Flexner and Osler, the heritage of which is still consistently present in medical education today even beyond the north American sphere.

Conclusions of these discussions seem to converge often on the need of reform to improve the output of the educational process, suggesting several new tools and even entire pedagogic paradigms to be introduced into postgraduate medical education.

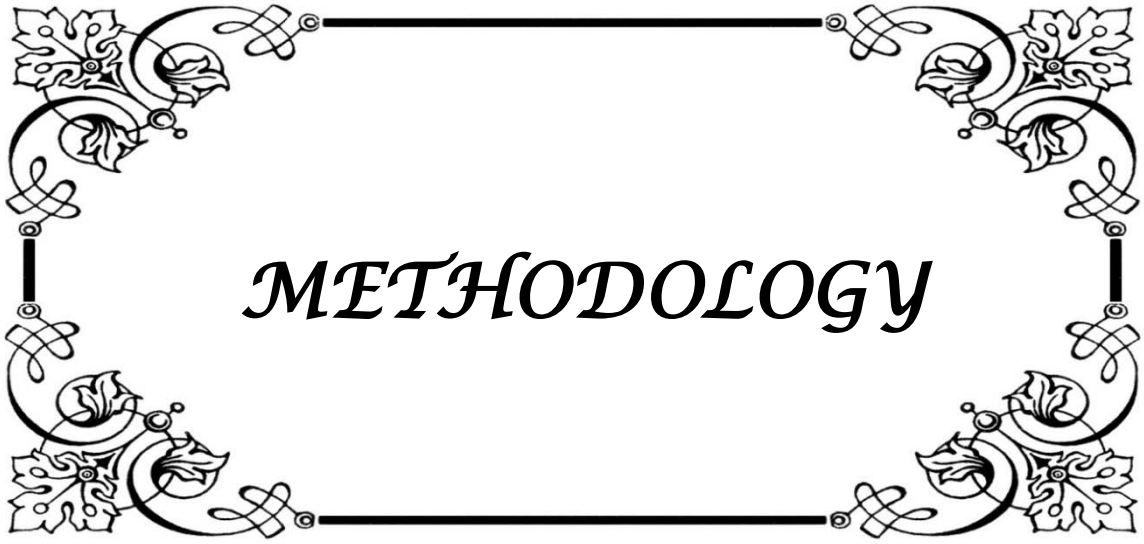
Paradigms or reforms that target concepts such as proficiency and competence as a result of medical training are often designed within outcome-based approaches or competency-based approaches of medical education.

Competency-based Post graduate medical education is defined by Frank et al. 2010 (2,3) as a competency-based residency paradigm, where training programs explicitly define desired graduate abilities and allow those outcomes to guide the development of curricula and assessment. And has been hailed consistently by various bodies of educators to be the paradigm that would drive education further.

Competency models have also been a consistent part of human resources management in professional settings consistently developed since the seventies of the past century.

However, the potential of both competency-based concepts comes with some structural adjustments that require a scaffolding framework to help support their weight on the current educational or professional construct.

Therefore, in this work, we attempt the design of a dual process framework outlining proficiency in Critical Care and Anesthesiology in our Moroccan context, where we strive to establish, through substantial review of literature and data collection; a historical continuum of the competence approach, a definition of competency and proficiency, a structural description of the dual process and finally have an outlook on assessment, all in the frame of Competency-based medical education.



METHODOLOGY

The framework is a competency-based medical education approach meant to guide residents in the specialty of Critical Care and Anesthesiology through the several phases of acquisition and maintenance of a proficient autonomy.

The framework was designed to have a dual structure made of two distinct tools complementary in structure, design and outcomes. Where one would be targeted at the acquisition while the other would favor maintenance.

These two tools are Milestones and a Competency dictionary.

The entire approach can be seen as matching the professional timeline of a Critical Care and Anesthesiology doctor.

This timeline starts with the phase of training or residency in which the resident embarks on a project of learning and acquisition of the various skills required for autonomous practice.

This phase was matched with a project management tool which is the Milestones meant to guide the resident through the several benchmarks of competency acquisition.

Concluding residency, doctors of the specialty integrate the healthcare workforce in Morocco in both the private and public sector which implies their description as human resources for the Moroccan health sector. Therefore, maintaining competency would then require a human resource management tool which is the Competency dictionary.

Methodology of development:

I. Milestones:

Drafting our milestones went through the following steps:

1. A review and deconstruction of the specialty milestones introduced by the ACGME to form a repository of ACGME competency descriptions:

First, a review and of these specialty milestones accredited by the ACGME:

"The Milestones guidebook" made public by the ACGME in 2020.(4)

"Anesthesiology Milestones" outlining several revised competencies and sub-competencies in anesthesiology made public in 2021(5)

"Critical Care Anesthesiology Milestones" outlining several revised competencies and sub-competencies in critical care 2022,

"The Critical Care Anesthesiology Milestone Project" made public in 2016 outlining several competencies and sub-competencies in critical care made public in 2022. (7)

The Milestones documents can be described as sets of worksheets: each worksheet is headed by a competency corresponding to one of the six core competencies agreed by the ACGME, each competency has its elements or sub-competencies outlined in a developmentary pattern from level 1 to level 5. Progression from one level to the other is done by achieving a set of milestones within the sub-competency.

Featured ACGME Sub-competencies are outlined in the table below for purpose of collation:

Critical Care 2016	Critical Care 2022
• Patient Care: Patient Assessment and Development of a Care Plan • Patient Care: Crisis Management • Patient Care: Procedural Skills/Technical Abilities/Interpretation • Patient Care: Management of Respiratory Failure • Patient Care: Palliative Medicine/End-of-Life Care	• Patient Care 1: Patient Assessment and Development of a Care Plan • Patient Care 2: Crisis Management • Patient Care 3: Procedural Skills/Technical Abilities/Interpretation • Patient Care 4: Respiratory Failure and Ventilation Management • Patient Care 5: Management of Organ Dysfunction and Shock
• Medical Knowledge: Pharmacology • Medical Knowledge: Medical Knowledge of Critical Care Medicine	• Medical Knowledge 1: Pharmacology • Medical Knowledge 2: Pathophysiology of Critical Illness
• Practice-based Learning and Improvement: Self-directed Learning and Scholarly Activity • Practice-based Learning and Improvement: Education of Team Members and Other Health Care Providers	• Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice • Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth
• Systems-based Practice: Interprofessional and Transitions of Care • Systems-based Practice: Incorporation of Patient Safety and Quality Improvement into Clinical Practice • Systems-based Practice: Understanding of Health Care Economics – cost awareness and cost-benefit analysis	• Systems-Based Practice 1: Patient Safety and Quality Improvement • Systems-Based Practice 2: System Navigation for Patient-Centered Care • Systems-Based Practice 3: Physician Role in Health Care Systems
• Professionalism: Commitment to Institution, Department, and Colleagues • Professionalism: Receiving and Giving Feedback • Professionalism: Responsibility to Maintain Personal Emotional, Physical, and Mental Health	• Professionalism 1: Professional Behavior and Ethical Principles • Professionalism 2: Accountability/Conscientiousness • Professionalism 3: Well-Being
• Interpersonal and Communications Skills: Communication with Patients and Families	• Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication • Interpersonal and Communication Skills 2: Complex Communication around Serious Illness • Interpersonal and Communication Skills 3: Interprofessional and Team Communication • Interpersonal and Communication Skills 4: Communication within Health Care Systems

Deconstruction of these sub-competencies was done through a set of multiple spreadsheets, each dealing with one of the core competencies of the ACGME:

Each spreadsheet is a comparison of milestones in Corresponding Sub-competencies between the 2016 and 2022 critical care models structured as shown in the example below:

Title of corresponding sub-competency: example: Patient Care: Patient Assessment and Development of a Care Plan:

	Level 1	Level 2	Level 3	Level 4	Level 5
Milestones of 2016	Milestone 1 Milestone 2 Milestone 3 Milestone 4	Milestone 1 Milestone 2 Milestone 3 Milestone 4	Milestone 1 Milestone 2 Milestone 3 Milestone 4	Milestone 1 Milestone 2 Milestone 3 Milestone 4	Milestone 1 Milestone 2 Milestone 3 Milestone 4
Milestones of 2022	Milestone 1 Milestone 2 Milestone 3	Milestone 1 Milestone 2 Milestone 3	Milestone 1 Milestone 2 Milestone 3	Milestone 1 Milestone 2 Milestone 3	Milestone 1 Milestone 2 Milestone 3

The numbers seen in the table do not refer sequence, they are description of types of milestones with the considerations made concerning them:

Milestones 1: featured throughout the spreadsheets in **black**, are milestone descriptions that are entirely identical in both issues of milestones.

Milestones 2: featured throughout the spreadsheets in blue, are milestone descriptions that are similar in the essence of content or share a common focus, that we judged in our review to be level compatible. In the 2022 version they are usually featured in a more summarized fashion.

Milestones 3: featured throughout the spreadsheets in green, are milestone descriptions that are also globally compatible but are judged to be inadequate with the level they were assigned or sometimes preferably assigned to an entirely different sub-competency or core competency.

Milestones 4: featured throughout the spreadsheets in red, are milestone descriptions that are exclusively seen in one model but are judged to be of particular value and will be included in the repository regardless of their absence from the other model.

It is not uncommon throughout the spreadsheets to also see crossed out milestone descriptions, to signify either that they have been completely discarded or in case they are color-coded to indicate which description would be implemented.

Two examples of the worksheets displaying the described process, relative to "Patient care: Patient Assessment and Development of a Care Plan" and "Medical Knowledge: Pharmacology" sub-competencies would be featured below in appendices.

A similar process was done in the purpose of collation between the Anesthesiology sub-competencies 2020 and the critical care sub-competencies 2022 that lead to solely preserving the patient care sub-competencies in Anesthesiology to eliminate redundancies.

These sub-competencies totaling 10 were then reviewed leading to upholding 7 sub-competencies, all anesthesiology specific. The other 3 were: "Application and Interpretation of Monitors ", "Situational Awareness and Crisis Management ", "Critical Care ", these sub-competencies held milestone descriptions that are largely congruent with critical care milestone descriptions and were therefore integrated in the previously outlined critical care tables for consideration.

The entirety of the outlined process, lead to building our repository of competency descriptions grouped according to their ACGME core competency and their respective level.

2. A review and deconstruction of the specialty EPAs implemented by the Royal College of Physicians and Surgeons of Canada and their canMEDS milestones to form a repository of canMEDS competency descriptions:

Second, a review of the specialty EPAs implemented by the Royal College of Physicians and Surgeons of Canada to form repository of competency descriptions:

Adult Critical Care Medicine EPA Guide. Critical Care Specialty Committee Ottawa: Royal College of Physicians and Surgeons of Canada; 2018 (French version) (8)

Anesthesiology EPA Guide. Anesthesiology Specialty Committee. Ottawa: Royal College of Physicians and Surgeons of Canada; 2018. (French version) (9)

EPA User Guide. Ottawa: Royal College of Physicians and Surgeons of Canada; 2019. (French version) (10) which outlines the standard structure for the EPAs.

Each EPA contains these features in order: a title, an EPA name, key feature, assessment plans, relevant canMEDS milestones. The stages of training outlined in the documents aimed at the specialty by the royal college amount to four:

1. Transition discipline (progression vers la discipline)
2. Foundation EPA (acquisition des fondements de la dicipline)
3. Core EPA (maitrise de la discipline)
4. TTP EPA or transition to practice EPA (transition vers la pratique)

Deconstruction of these EPAs was done in two large spreadsheets, one for Critical Care and the other for Anesthesiology. These spreadsheets, using the French language version of EPAs, consisted of one massive array that dealt with three particular components of EPAs: the EPA name, Key features and relevant CanMEDS milestones. Rearrangement was done along the lines of CanMEDS core competencies and the stages of training, with the EPA name and key features being reported only once to its dominant canMEDS core competency.

These core competencies being: ME=Medical Expert, COM=Communicator, COL=Collaborator, L = Leader, HA=Health Advocate, S=Scholar and P = Professional.

The array was generally structured as such: (taking as an example EPAs dominated by ME canMEDS milestones):

	Transition discipline	Foundation EPA	Core EPA	TTP EPA
ME	EPA name + Key features type 1 Relevant CanMEDS MILESTONE type 1	EPA name + Key features type 1 Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 3	EPA name + Key features type 1 EPA name + Key features type 2 Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2 Relevant CanMEDS MILESTONE type 3	EPA name + Key features type 1 EPA name + Key features type 2 Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2 Relevant CanMEDS MILESTONE type 3
COM	Relevant CanMEDS MILESTONE type 1	Relevant CanMEDS MILESTONE type 1	Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2	
COL	Relevant CanMEDS MILESTONE type 1	Relevant CanMEDS MILESTONE type 1	Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2	Relevant CanMEDS MILESTONE type 1
L	Relevant CanMEDS MILESTONE type 1		Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2	Relevant CanMEDS MILESTONE type 1
P		Relevant CanMEDS MILESTONE type 1	Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2	Relevant CanMEDS MILESTONE type 1
HA			Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2	
S			Relevant CanMEDS MILESTONE type 1 Relevant CanMEDS MILESTONE type 2	Relevant CanMEDS MILESTONE type 1

EPA name + Key features type 1: refers to the EPAs with a visible pattern of progression throughout the stages of training, color-coded red in our model to outline its spread throughout the array.

EPA name + Key features type 2: refers to the EPAs that are either the introduction of another competence expected in more advanced phases or keeps the core competence but takes on rather a new goal as the phases progress, color-coded green.

Relevant CanMEDS MILESTONE type 1: refers to the milestones associated with the EPA type 1 and inherit its pattern of progression, which is why they were also outlined in red

Relevant CanMEDS MILESTONE type 2: refers to the milestones associated with the EPA type 2, which is why they were also outlined in green.

Relevant CanMEDS MILESTONE type 3: refers to the milestones associated with an EPA dominated by another core competency and whose EPA will evidently not figure anywhere in the array, outlined in our example in blue.

The same process was applied to the EPAs all across the guides for Critical Care and Anesthesiology and does provide us with a rich repository of Canadian competency descriptions. However, due to the structure in which CanMEDS milestones are made, they are often included in several EPAs at once, which makes them often redundant and repetitive all across the EPA guides which requires a selection process in which examining the array would show a CanMEDS milestone outlined in only one EPA and in only one phase. This was done by our own assessment of affinity of a specific milestone to a specific EPA and to a specific stage of training, for example: in an EPA describing performance of procedure, one milestone is often re-iterated as such:

	Transition discipline	Foundation EPA	Core EPA
ME	**EPA: Performing the basic procedures of CCM:** CanMEDS milestone: Efficiency and flow: Obvious planned course of procedure with economy of movement and flow	**EPA: Performing the common procedures of CCM:** CanMEDS milestone: Efficiency and flow: Obvious planned course of procedure with economy of movement and flow	**EPA: Performing the advanced procedures of CCM:** CanMEDS milestone: Efficiency and flow: Obvious planned course of procedure with economy of movement and flow

In this example the process of rearrangement of the Canadian model will see this CanMEDS milestone associated in our final repository, with exclusively: the EPA: Performing the advanced procedures of CCM and the stage of core EPA.

Rearranging the Canadian EPAs and CanMEDS milestones saw a lot of deletions where the original spot was consistently highlighted to prompt reconsiderations. Resulting in the rearranged and slimmed repository of competency description, however unfortunately, the spreadsheet was still too voluminous to be compatible with a printed version.

3. The Four skill groups and drafting our Milestones:

Having secured these two repositories of milestone descriptions, we have chosen for reason outlined later on, to adopt our own view of competency groups to mirror core competencies that we also often refer to as skill groups coming at a total of four:

- Practical care skills
- Collaboration abilities
- Healthcare professional attributes
- Medical knowledge development and scholarly activity

These skill groups are compatible with both core competencies and can be outlined as such:

	CanMEDS core competencies	ACGME core competencies
Patient care skills	Medical Expert (EM)	Patient Care
Collaboration skills	Communicator (COM) Collaborator (COL) Leader (L)	Systems-based Practice Interpersonal and Communications Skills
Healthcare professional attributes	Professional (P) Health advocate (HA) Leader (L)	Professionalism Systems-based Practice Interpersonal and Communications Skills
Medical knowledge development and scholarly activity	Scholar (S)	Medical Knowledge Practice-based learning

Evidently, elements of the two repositories need to be fitted with the corresponding skill. Luckily, feasible through color coded highlights since the repositories are mostly in array or table form; a five color-coded system of highlights was used to cover the entirety of the arrays, where one color refers to compatibility with a particular skill group. An exception was made for Patient care skills, where skills of procedural nature received increased consideration and their own highlight color to help merge their spread-out deployment all over the repositories in both Critical Care and Anesthesiology.

This rearrangement through highlights regards all of the elements of competency in the repositories, not as a unit, but as solitary elements, which means it can interest the entirety of an EPA name for example as much is it can only interest a single CanMEDS milestone, however infrequent that is.

Having secured this significant amount of competency descriptions that are now substantially compatible thanks to adopting the four skill groups, work began on drafting our own milestones.

Writing up our own version of milestones, was initiated by conjuring a massive array joining the repositories of Canadian and American origins to facilitate comparison in the frame of a five-phase system:

The spreadsheets for such an array were structured as such:

Theme of described competency + Phase of competency

Descriptions adapted from the American repository	Descriptions adapted from the Canadian repository	Our drafting of the milestones adequate to the phase (done in French)

Examples:

Planification de la prise en charge anesthésique et gestion de la douleur : Phase 1

Identifies the components of an anesthetic plan Identifies the components of a pain management plan Identifies potential impact of anesthesia beyond intra-operative period	Selon les priorités établies dans une approche centrée sur le patient, chercher de l'aide pour déterminer l'ordre d'exécution de multiples tâches concurrentes à accomplir. Déterminer le plan de prise en charge anesthésique le plus approprié compte tenu de l'état du patient et de l'intervention chirurgicale pratiquée	Reconnaît les divers éléments d'un plan de prise en charge anesthésique en spécifiant un ordre prioritaire d'exécution centré sur le patient Enumère les stratégies de gestion de la douleur adaptées aux ressources institutionnelles

Communication avec patients, familles et proches aidants : Phase 1

Effectively communicates routine information in a respectful and culturally-sensitive manner	*Communiquer avec le patient, sa famille et ses proches aidants de façon claire et précise, en faisant preuve de compassion et de respect *Consigner l'information pertinente * Tenir à jour des listes exhaustives de problèmes *Démontrer, lors des échanges, de l'empathie, du respect et de la compassion envers le patient afin de renforcer sa confiance et son autonomie	Communique avec le patient, sa famille et ses proches aidants et transmet des informations au sujet de l'évolution médicale et du plan de prise en charge avec clarté et précision en faisant preuve de compassion et de respect
Obtains informed consent/assent for routine procedures using language appropriate to the patient's and family's level of understanding	*Structurer les informations de manière systématique dans un dossier médical électronique ou écrit *Documenter la rencontre clinique pour qu'elle reflète fidèlement la discussion et les décisions	Utilise un langage approprié et exempt de jargon médical pour assurer la compréhension et affirmer le consentement de la famille et des proches aidants
Recognizes situations where communication of information requires the assistance of another individual and asks for help	*Reconnaître, vérifier et valider les signes non verbaux du patient ou de sa famille et de ses proches aidants * Recourir à des stratégies pour vérifier et confirmer que le patient, sa famille et ses proches aidants comprennent les informations transmises	Reconnaît les situations où la communication nécessite l'intervention d'un autre individu ou l'assistance des ressources fournies par l'institution (traducteur, psychiatre...)
Recognizes that institutional resources are available to assist with disclosure of medical errors		

Applying the same construct to our repositories affixed with data of local practice helped us reach a preliminary draft of competency elements in Critical Care and Anesthesiology.

These were descriptions of comprehensive themes and were designed over 5 phases of competency acquisition where the 4th is designated as the phase compatible with the proficiency required for autonomous practice.

These descriptions were then grouped together in table form, outlining their theme of competency and their progression through the five phases, followed by an eventual language check, these tables were structured as such:

Thematic description of the skill (title)

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Milestone	Milestone	Milestone	Milestone	Milestone
Milestone	Milestone	Milestone	Milestone	Milestone
Milestone	Milestone	Milestone	Milestone	Milestone

It was preferred as a default setting that the milestones most directly related to the theme of the skill as well as demonstrating a pattern of progression be placed in parallel at the top of the columns as outlined in red.

The total of initial worksheets was at 21, five of which were Critical Care specific, seven of which were Anesthesiology specific and nine of which interested the entirety of the specialty.

Competencies described in those worksheets covered several themes all falling within the boundaries of the four skill groups.

The preliminary draft of the developed milestones of Critical Care and Anesthesiology is included in the appendices below.

II. Expert Review and Consensus:

Having acquired our first draft, the next step was to have reviewed by a field of experts on the national level.

Under the banner of SMAAR, the Moroccan Society of Anesthesia, Analgesia and Critical Care ("Société Marocaine d'Anesthésie, d'Analgésie et de Réanimation "), a Delphi consensus method coupled with a subsequent forum of discussion was conducted.

The taskforce participating in the Delphi consisted of the Moroccan Board of anesthesiology critical care and (MBACC), "Collège marocain d'anesthésie réanimation (CMAR)" operating in the frame of SMAAR.

The board is comprised of several members, namely, the chairman of SMAAR, the chairman of FNAR ("FÉDÉRATION NATIONALE DES ANESTHÉSISTES-RÉANIMATEUR DU MAROC"), chairmen of regional associations and Faculty diploma officials, members holding executive positions in different university hospitals and regional associations : 4 members presenting university hospitals, 4 members presenting the private sector, 4 members presenting the public sector and 2 members presenting military affiliated departments, along with other honorary members, per article 2 of the regulations of the board adhered by SMAAR.

The entirety of the board was invited to participate in reviewing the first draft.

The Delphi commenced with a summarized description of the methodology along with other various sources and materials such the ACGME milestones and the EPA guides for further in-depth considerations.

Voting consisted of rating 21 worksheets of the competency draft, each worksheet outlined one theme of competency at a time along with its milestones. This meant that it comprised of a total of 21 units that required mandatory voting.

Voting was done, to rate their perceived level of importance, on a scale from 1 to 5, with 1 being "not important" and 5 being "very important", each accompanied with a request of written critics or recommendations left up to the discretion of the participants.

The Delphi, in order to maximize its efficiency, was chaperoned by explicative vocal commentaries.

A threshold of acceptance of each of the units was set at two-thirds of the vote scoring an importance level of 4 or 5.

This acceptance however, was still subject to the results of the forum of discussion subsequent to the vote and some particular Veto votes from prominent members of the Board.

The Delphi and discussion lead to revisions of the first draft of milestones: it saw the dissolution of a competency theme intitled "Maintien du bien-être personnel" and the re-purposing of its relevant milestones in other units, notably a milestone regarding well-being and the responsibility of maintaining it to ensure professional care. Also, more emphasized inclusion of pain management and analgesia were advised as well as revision of several terms judged to provide more adequate descriptions.

Milestone product revision resulted in the drafting of modified milestones totaling at 20 maintaining the same chosen structure.

These modified milestones were then presented to the board for a second review and consensus on a dedicated forum.

The resulting final edit of the milestones in our framework of competency after consensus of the board are outlined in the result section below.

III. Competency Dictionary:

As the first structure of the dual process framework was finalized, development of the Competency Dictionary, the second structure of the framework, was undertaken.

Drafting the competency dictionary abided by the three elements of design which are knowledge ("Savoir"), skill ("Savoir-faire") and attributes ("Savoir-être").

Proximity with the four skill groups meant that designing Competency dictionary based on the milestones is feasible and helps reinforce the compatibility of the two structures.

Phase 4 milestone descriptions were used in the drafting of the competency dictionary coupled with competency descriptions found in earlier phases judged to be of particular importance warranting them a feature in the Competncy Dictionary regardless of phase.

These milestone descriptions were edited in a form of a summary description of the competence theme, while maintaining their essential elements. Associating them together, formed an entire profile of competencies that conformed to the three elements of design of a competency dictionary outlined above, and were then validated by reaching consensus on the board's forum.

The resulting profile is included below in the results section.

RESULTS

I. The Delphi round of voting:

The following figures outline the results of the Delphi round of voting, during which a sum of 19 experts of MBACC participated in rating 21 elements of consideration.

Each figure is followed by commentary received from the experts.

A threshold of acceptance of each of the units was set at two-thirds of the vote scoring an importance level of 4 or 5 pending confirmation through the forum of discussion.

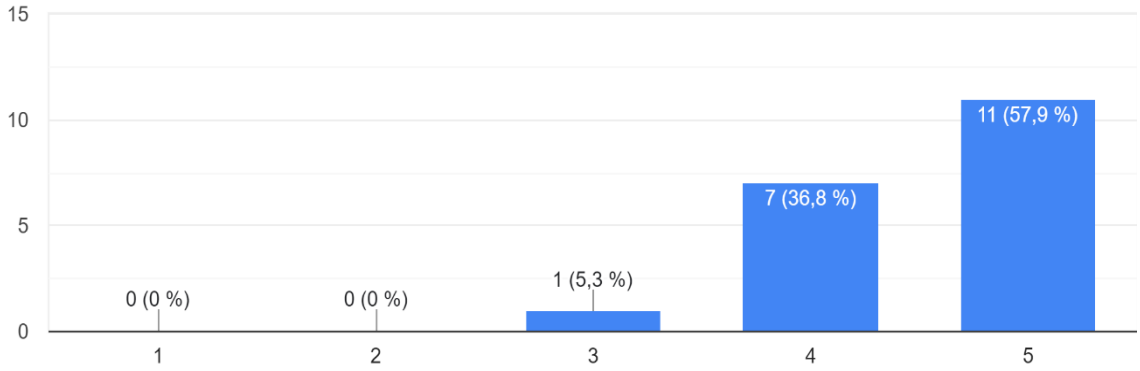


Chart 1 : Évaluation des patients et développement des plans de soins

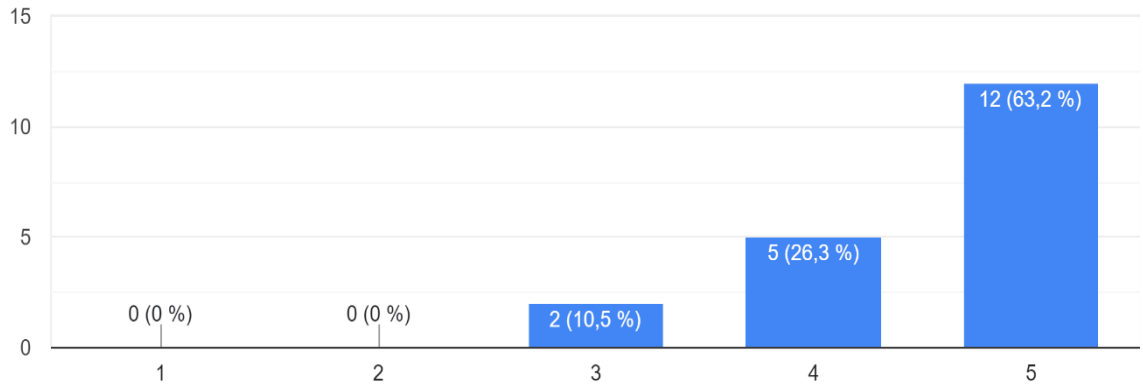


Chart 2 : Gestion d'événements aigus et dysfonctions d'organes

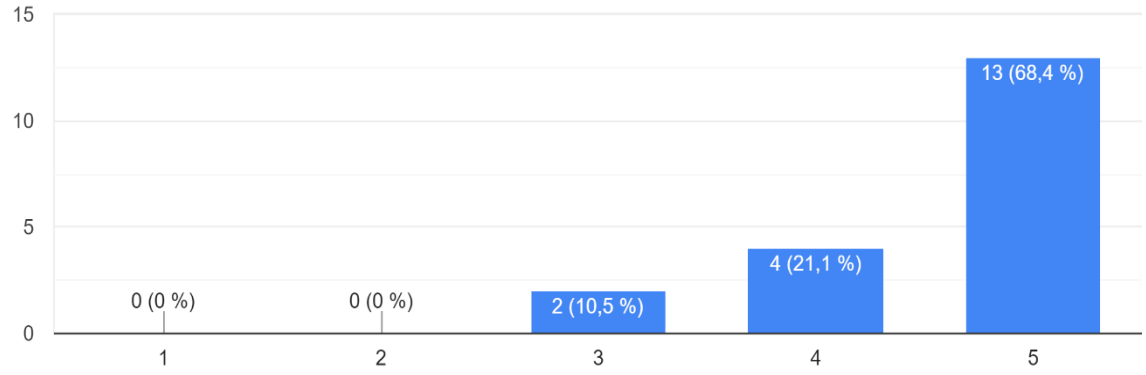


Chart 3 : Habilités procédurales pratiques et interprétations

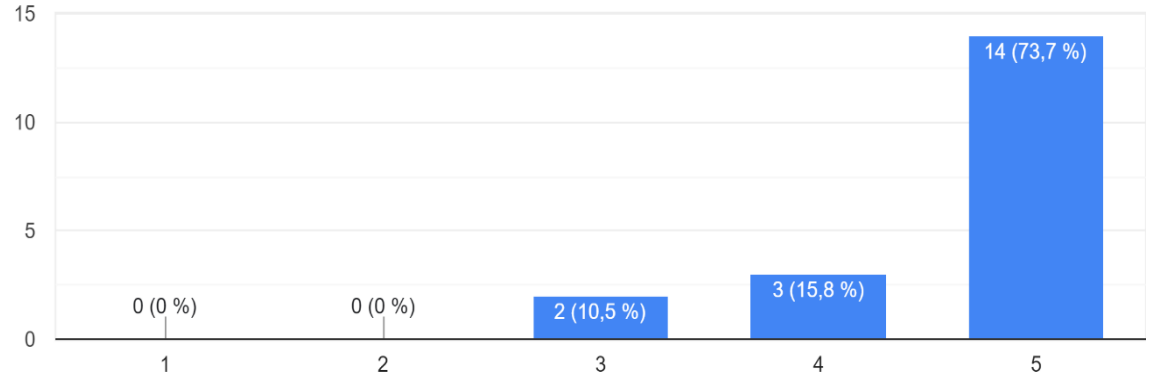


Chart 4 : Gestion respiratoire en unité de réanimation

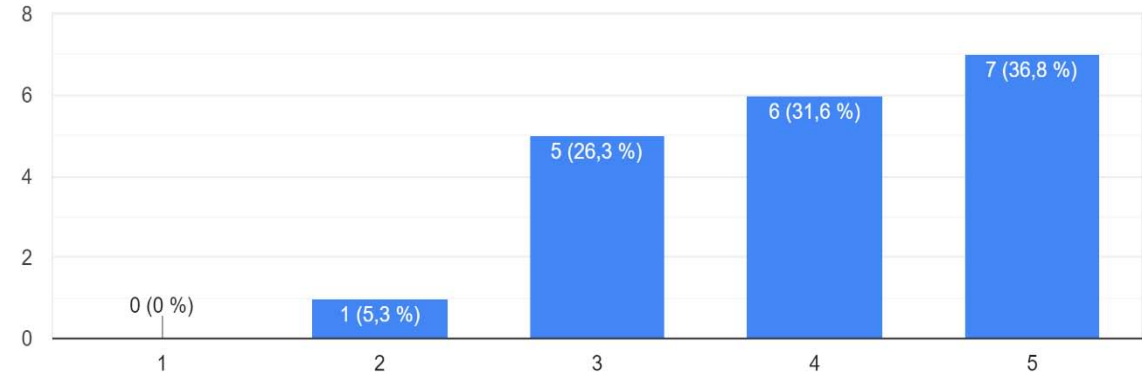


Chart 5 : Soins palliatifs et soins de fin de vie

Commentary: « Pour la mise en route d'une procédure LATA... je propose d'insister sur la prise de décision conjointe entre le personnel médical et paramédical d'une part et la famille d'autre part....la prise de décision ne devrait pas émaner d'une seule personne... généralement le médecin astreinte de garde.... »

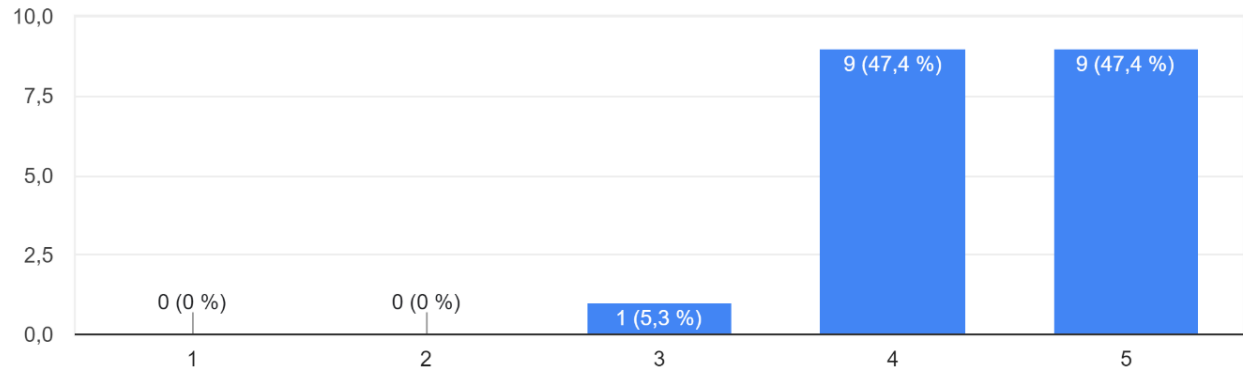


Chart 6 : Pharmacologie

Commentary: « J'insiste sur le rôle indispensable et indiscutable des pharmaciens cliniciens au sein des services de réanimation comme interlocuteur incontournable... »

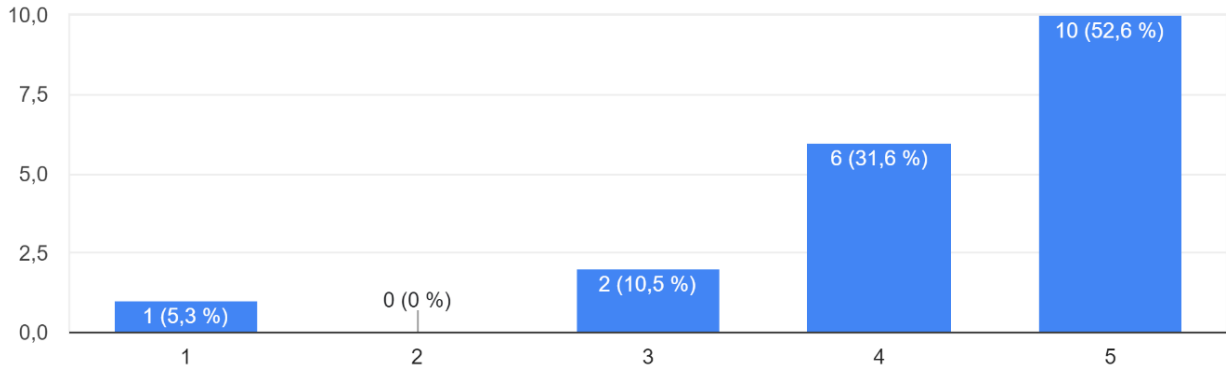


Chart 7 : Développement des connaissances médicales et activités d'érudition

Commentary : « Penser à Monitorer cette courbe d'apprentissage à la phase 1 -2-3 »

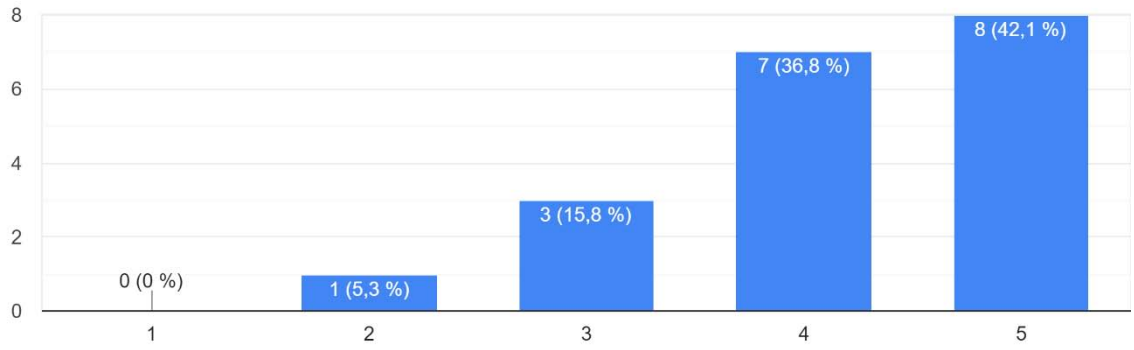


Chart 8 : Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins

Commentary: « Je propose de rajouter le caractère fort souhaitable voire obligatoire d'une formation continue au sein de l'équipe médicale et paramédicale sur la gestion du conflit au sein de hôpital.... »

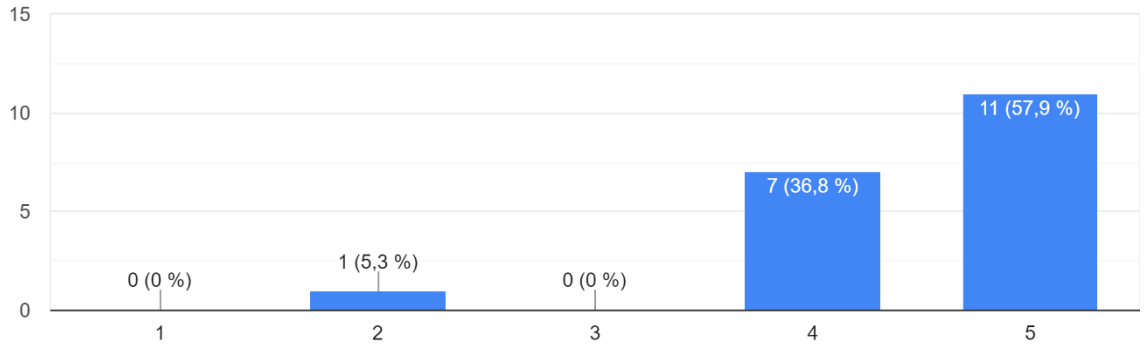


Chart 9 : Adoption d'une déontologie professionnelle

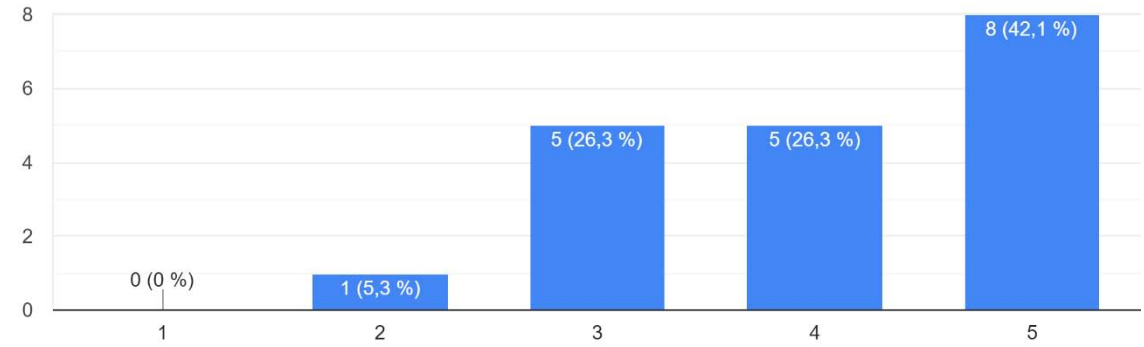


Chart 10 : Économie de santé et coûts de soins

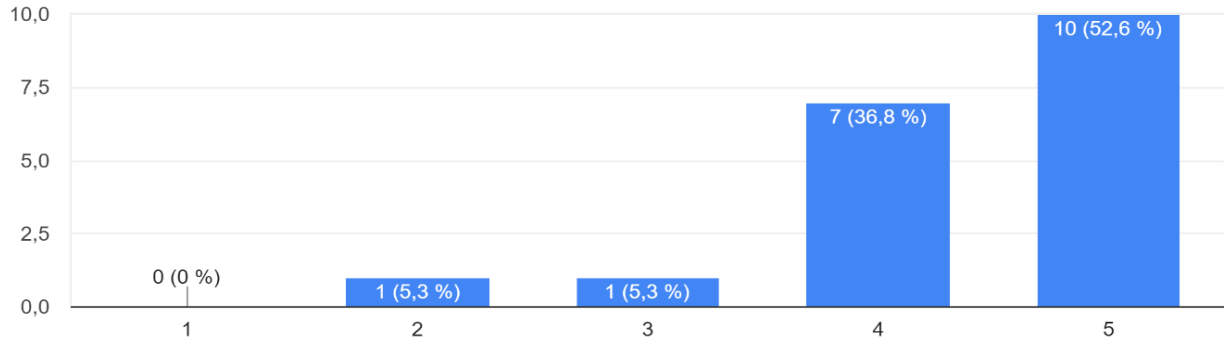


Chart 11 : Éducation et encadrement des membres de l'équipe de soins

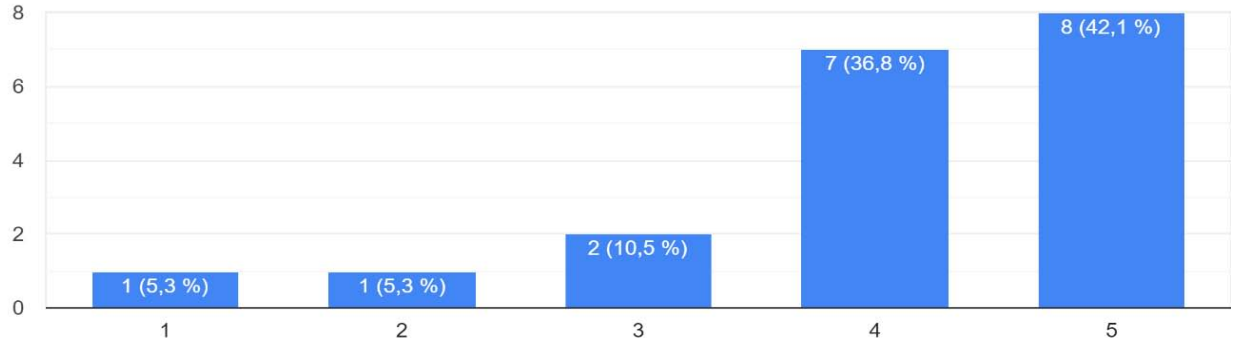


Chart 12 : Feedback professionnel

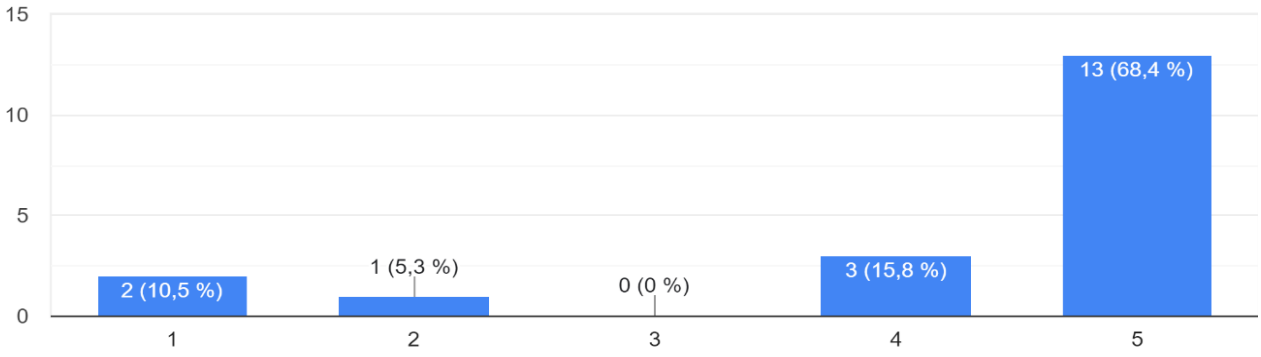


Chart 13 : Maintien du bien-être personnel

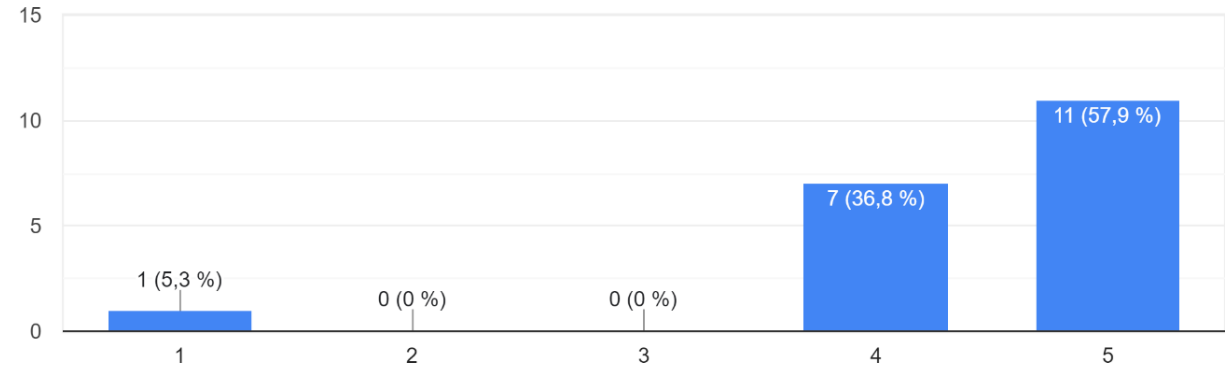


Chart 14 : Communication avec patients, familles et proches aidants

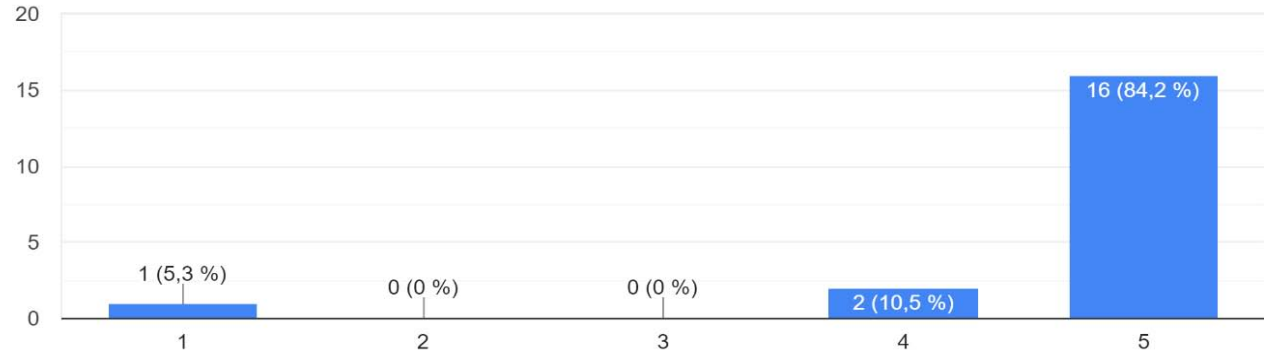


Chart 15 : Évaluation pré-anesthésique

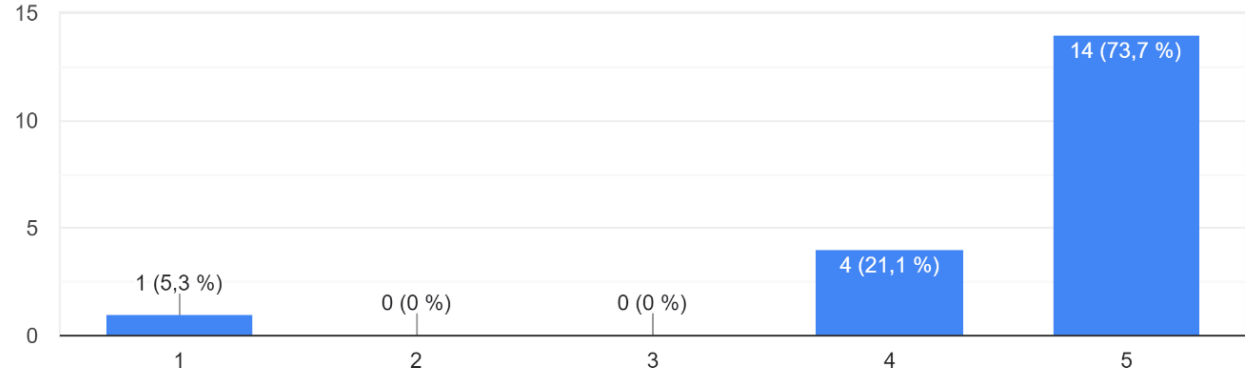


Chart 16 : Planification de la prise en charge anesthésique et gestion de la douleur

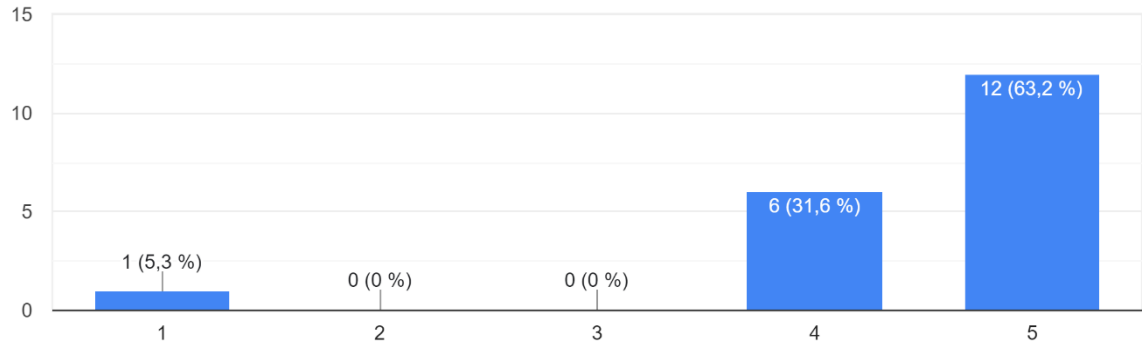


Chart 17 : Gestion du per-opératoire

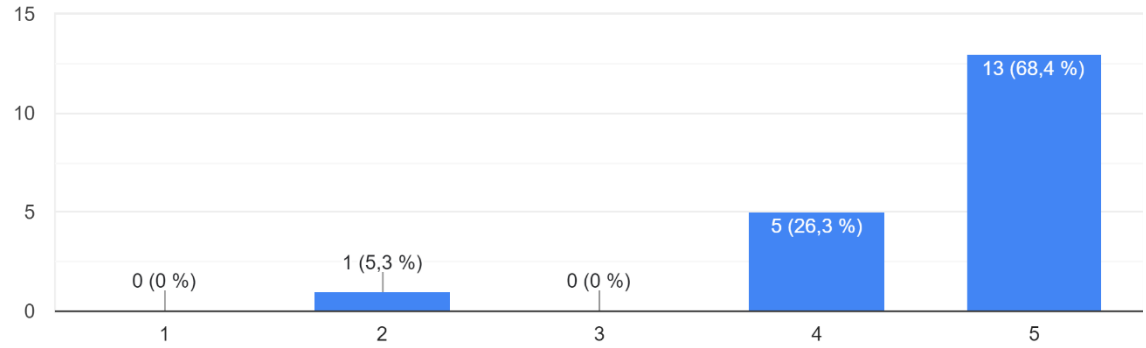


Chart 18 : Gestion des voies aériennes

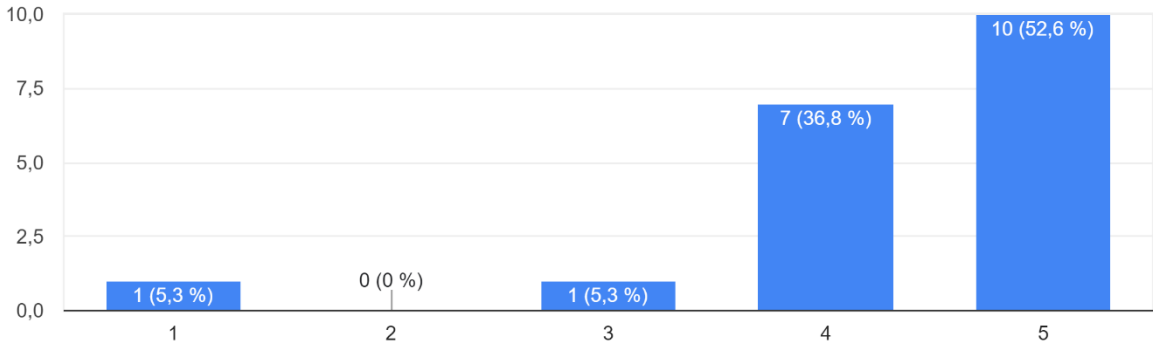


Chart 19 : Explorations échographiques d'urgence

Commentary :

- « Et médecine perioperatoire »
- « Ne pas limiter à l'urgence. »

- « Explorations échographique en anesthésie réanimation. »
- « Exploration échographique en réanimation et en anesthésie »

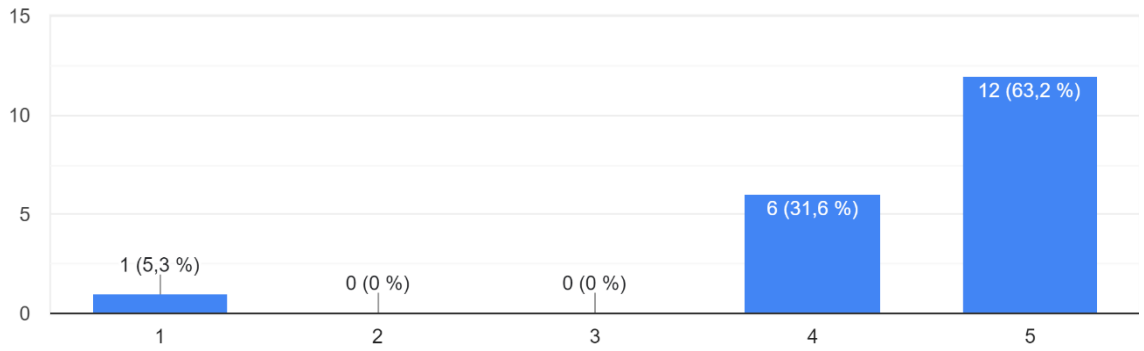


Chart 20 : Gestion du post-opératoire

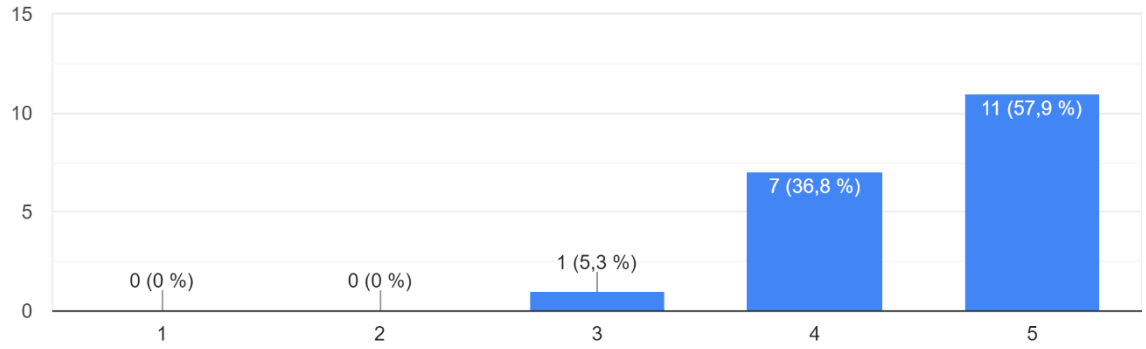


Chart 21 : Anesthésie régionale

Commentary :

- « Revoir l'approche de la douleur et sa prise en charge dans le référentiel »
- « Anesthésie analgésie locorégionale aigue et chronique »
- « Ajouter un jalon sur l'analgésie aiguë et chronique »
- « Le titre : anesthésie et analgésie locorégionale »
- « Dans la phase 2 : encadrement toujours et pas face aux difficultés. »
- « Faire éventuellement un jalon autour du traitement et gestion de la douleur aigue et chronique »

II. Critical Care and Anesthesiology Milestones validated by MBACC:

These milestones are the final version of Milestones agreed by the board, displayed as designated by MBACC:

Ce référentiel est une description globale qui consiste à établir une structure « framework » sous forme de « Jalons » de compétences avec 5 phases de progression ou l'atteinte des phases 4 des différents jalons correspondrait à l'acquisition du profil souhaitable du métier, il a pour objectifs de guider :

- Les médecins Anesthésistes-Réanimateurs, qu'ils soient diplômés ou en cours de formation, sur le chemin de l'acquisition de leur autonomie et de maintenance de compétences,
- L'établissement des futurs référentiels de formation initiale et continue qui développeront les objectifs d'apprentissage, les thématiques, les modalités pédagogiques …,
- Les modalités d'évaluations ou d'accréditations éventuelles …

Ce Framework couvre 20 jalons ci-après, relevant d'habilités de pratiques de soins, de coopération, de professionnalisme et de développement des connaissances et de l'érudition, développés après un large effort d'hybridation dont le but principal est de concevoir un modèle compatible avec notre contexte Marocain.

1. Évaluation des patients et développement des plans de soins
2. Gestion d'événements aigus et dysfonctions d'organes
3. Habilités procédurales pratiques et interprétations
4. Gestion respiratoire en unité de réanimation
5. Douleurs, Soins palliatifs et soins de fin de vie
6. Pharmacologie
7. Évaluation pré-anesthésique
8. Planification de la prise en charge anesthésique et gestion de la douleur
9. Gestion du per-opératoire
10. Gestion des voies aériennes
11. Explorations échographiques
12. Gestion du post-opératoire
13. Anesthésie et analgésie locorégionale
14. Développement des connaissances médicales et activités d'érudition
15. Communication avec patients, familles et proches aidants
16. Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins
17. Adoption d'une déontologie professionnelle
18. Éducation et encadrement des membres de l'équipe de soins
19. Feedback professionnel
20. Économie de santé et coûts de soins

Évaluation des patients et développement des plans de soins :

Trace un chemin vers l'autonomie des différentes étapes de la prise en charge

Souligne l'évolution souhaitée de l'évaluation initiale vers une évaluation complète associée à une indentification clinique de la présentation et son évolution

Souligne l'évolution souhaitée de la planification de la prise en charge d'un rôle effecteur vers un rôle de prise de décision et planification autonome

Évaluation des patients et développement des plans de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Réalise une évaluation clinique initiale ciblée Indique les examens paracliniques et les techniques d'imagerie initiaux et adéquats Nécessite un encadrement pour identifier un diagnostic initial en signalant les éléments physiopathologiques pertinents Nécessite un encadrement pour établir la priorité des patients selon la gravité clinique	Nécessite un encadrement pour identifier un diagnostic initial face des présentations cliniques atypiques Nécessite un encadrement pour élaborer un plan de prise charge initiale qui tient compte de la complexité, de l'incertitude et de l'ambiguïté inhérentes à la situation clinique du patient Sollicite des informations pertinentes aux soins auprès du patient, sa famille et ses proches aidants Reconnait le besoin de recourir aux expertises des autres spécialités pour optimiser la prise en charge	Établit avec autonomie relative, un diagnostic initial face à des présentations courantes atypiques Reconnaît les tableaux de défaillance d'organe et ajuste le plan de soins suivant Élabore et adapte un plan de prise en charge tenant compte du degré d'urgence clinique, de l'évolution et des comorbidités du patient pour établir un ordre de priorité des interventions Reconnaît, avec assistance, les signes indiquant que le moment est venu de délaisser l'approche d'acharnement thérapeutique et prendre les mesures qui s'imposent Sollicite des avis des collègues et autres spécialités pour optimiser la prise en charge	Évalue et identifie la présentation clinique et développe, avec autonomie, un plan de soins ainsi qu'un plan d'évaluation continue Adapte les soins au fil de l'évolution et guette les éléments qui indiquent l'imminence de futilité de soins Utilise d'une manière judicieuse les avis des collègues et autres spécialistes ainsi que les ressources limitées au moment de crises	Sollicité dans un rôle de conseiller dans la prise en charge des patients de soins intensifs Développe des modèles d'évaluation et planification de prise en charge pratiques et adaptés aux ressources de l'institution Coordonne le recours aux services de consultations

Gestion d'événements aigus et dysfonctions d'organes :

Trace un chemin vers la gestion souhaitée des états de chocs, dysfonctions d'organes et autres urgences largement associées avec les soins de Réanimation Anesthésie

Souligne l'évolution souhaitée du repérage de la survenue des évènements aigus vers l'anticipation lorsque possible et la prise en charge de ces évènements

Gestion d'événements aigus et dysfonctions d'organes

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît les évènements aigus, les états de chocs et les patients en détérioration (en USI ou en pèri-opératoire) Effectue la mise en condition initiale du patient selon la séquence ABCDE Reconnaît ses propres limites, et demande de l'aide au besoin	Évoque les diagnostics étiologiques et différentiels des événements aigus dans un ordre de probabilité Initie les efforts actifs de réanimation Effectue une évaluation continue du patient, concomitante à la prise en charge Initie la prise en charge étiologique, par une coopération per-critique avec les autres services pour des avis spécialisées	Se familiarise avec les présentations atypiques des états de chocs Gère avec autonomie relative, les évènements aigus, les états de chocs et les défaillances d'organe Démontre une conscience situationnelle et agit avec détermination pour maintenir un contrôle des situations de crise Reconnaît les circonstances où les efforts de réanimation ne sont plus efficaces et devraient être interrompus Recourt à l'encadrement pour guider la gestion des ressources limitées en situations de crise	Anticipe et gère avec autonomie les événements aigus et agit pour minimiser les conséquences d'une défaillance d'organe multi systémique Démontre une capacité de gestion face à un flux de patients critiques Décide et assume avec autonomie relative, la responsabilité d'allocation des ressources vitales limitées à des patients jugés ayants plus de chances de survie	Sollicité dans un rôle de conseiller dans la gestion des patients critiques au niveau départemental et institutionnel Développe et défend des critères de priorités des patients adaptés aux ressources de l'institution

Habilités procédurales pratiques et interprétations

Trace un chemin vers l'autonomie de la préparation, l'installation et l'interprétation des différents moyens de monitorage

Souligne l'évolution souhaitée des procédures et moyens de monitorage de base vers d'autres, plus invasifs et plus compliqués à assurer ou à interpréter

Habilités procédurales pratiques et interprétations

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Assure la préparation de la salle d'opération ou l'unité de réanimation (médicaments et les étiquettes de seringues...) puis installe et interprète les moyens de monitorage invasif de base pour l'intervention prévue (cathéters artériels et cathéters veineux centraux) Recourt à l'encadrement pour l'installation des moyens invasifs avancées de monitorage Interprète les résultats de gazométrie artérielle et décèle les déséquilibres physiologiques Peut nécessiter plus d'incitation à prioriser des interventions selon le degré d'urgence ou la possibilité de détérioration, évoquer la possibilité de dysfonctionnement de l'équipement de monitorage face à des données non justifiée	Assure la préparation et l'installation du patient en démontrant une orientation spatiale, une connaissance des étapes spécifiques, le regroupement du matériel nécessaire, des procédures d'hygiène et stérilité tout en tenant compte de l'urgence et des risques possibles Assure avec autonomie relative, la mise en jeu des moyens de monitorage invasifs avancés (techniques hémodilution, cathéterisation artère pulmonaire, ...) Recours à l'encadrement pour l'exécution des intervention avancées (drainage thoracique, cricothyroidotomie, bronchoscopie ...) Interprète, avec assistance, les données de monitorage avancé et rapporte à l'encadrant	Indique le monitorage avancé selon les comorbidités du patient, les données de monitorage basique et l'intervention prévue Installe avec autonomie relative, des mesures de monitorage avancées en association aux efforts de réanimation et en interprète les données, en vue d'une adaptation du plan de prise en charge Exécute efficacement les étapes sous assistance, avec fluidité et économie des mouvements en évitant l'erreur de fixation Élimine la possibilité de dysfonctionnement de l'équipement face à des données non justifiées Manipule les paramètres, pendant une échographie ciblée, pour plus d'optimisation et reconnaît les résultats significatifs	Indique et Installe avec autonomie, des mesures de monitorage avancé et fournit une interprétation contextuelle des données Fait preuve d'une planification autonome de l'intervention en l'exécutant avec fluidité et économie des mouvements et en préservant les tissus mous Reconnaît les dysfonctionnements de l'équipement ainsi que des solutions de rechange provisoire visée à assurer la continuité de l'intervention Capable avec autonomie relative d'encadrer les autres pendant des interventions avancées Assiste à des formations en matière de méthodes de monitorage avancées	Assure le rôle de conseiller en matière de techniques de monitorage avancées Participe au développement des guides départementaux pratiques orientant le choix des techniques de monitorage, des protocoles d'interprétation et la gestion des données de monitorage Élabore des plans pour la mise à jour des techniques de monitorage Réussit des programmes de certification en monitorage avancé

Gestion respiratoire en unité de réanimation

Trace un chemin vers l'autonomie de l'évaluation des voies aériennes et la gestion des évènements respiratoires

Souligne l'évolution souhaitée de la gestion respiratoires de la prise en charge initiale vers une maitrise des différents moyens de ventilation

Gestion respiratoire en unité de réanimation

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnait l'insuffisance respiratoire aigüe ainsi que ses diagnostics différentiels Nécessite l'encadrement pour développer un plan d'intervention adéquat Assure une évaluation initiale des voies respiratoires et la mise en œuvre initiale des techniques de ventilation de base (dont non invasives)	Évoque des étiologies plus complexes d'insuffisance respiratoire Nécessite l'encadrement pour évaluer la méthode de ventilation adéquate (invasive ou non invasive) et la mise en œuvre d'un plan de prise en charge initiale Établit le lien entre ses connaissances en physiologie et interactions cardio-pulmonaires et l'anticipation en temps réel des variations du travail respiratoire et des impacts sur les autres systèmes	Adapte, avec assistance, la méthode de ventilation en fonction de données pertinentes et de la complexité de la situation Pose, avec assistance, l'indication de trachéotomie, d'une oxygénation par membrane extracorporelle et autres méthodes avancées Avec assistance, anticipe et gère les variations du travail respiratoire et les impacts sur les autres systèmes	Évalue avec autonomie, la présentation de l'insuffisance respiratoire ainsi que ses implications systémiques et met en œuvre un plan de gestion adéquat Maitrise les méthodes de ventilation variées ainsi que les interventions éventuellement associées	Participe et dirige le développement pratique des procédures de la prise en charge respiratoire, des stratégies de ventilation ainsi que l'amélioration du matériel de ventilation

Soins palliatifs et soins de fin de vie

Souligne l'évolution souhaitée vers une prise en charge palliative, largement et souvent associée à la prise en charge en milieu de réanimation et les différentes considérations et défis à faire face à une situation de fin de vie

Douleurs, Soins palliatifs et soins de fin de vie

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît l'utilité de concevoir de plans de prise en charge de la douleur et des soins palliatifs en accord avec les objectifs exprimés par le patient, sa famille ou ses proches aidants	Nécessite l'encadrement pour identifier le moment de passage au soins palliatifs Reconnaît la détresse émotionnelle que le passage aux soins palliatives génère Reconnaît les défis éthiques, moraux et culturels associés à la douleur et aux soins de fin de vie Nécessite l'encadrement pour choisir les moyens pharmacologiques et les interventions thérapeutiques de gestion de la douleur et des soins palliatifs Reconnaît les critères qui permettent d'identifier les occasions de don d'organes	Nécessite l'encadrement pour établir et adapter les approches décisionnelles en fonction de la capacité décisionnelle du patient, des informations sur les croyances, les valeurs, les préférences, le contexte et les attentes du patient, sa famille, ses proches aidants, relatives aux soins qui lui sont prodigués Capable avec autonomie relative de choisir les moyens pharmacologiques et les interventions thérapeutiques nécessaire lors du passage aux soins palliatifs ainsi que juger la nécessité des ressources d'accompagnement et y faciliter l'accès	Établit et exécute et adapte des plans de soins palliatifs faisant preuve de la flexibilité nécessaire pour faire face aux fardeaux culturels et moraux ainsi que l'évolution de la complexité et de l'incertitude associées aux soins de fin de vie Capable de choisir avec autonomie les moyens pharmacologiques et les interventions thérapeutiques nécessaires à la gestion de la douleur et des soins palliatifs Applique de manière autonome les directives concernant l'établissement du diagnostic de mort cérébrale Identifie les occasions de don d'organes, documente l'évaluation et la discussion relative au don d'organes et élabore des plans pour maintenir l'homéostasie du donneur	Sert de liaison entre les patients et les ressources institutionnelles de gestion de la douleur et soins palliatifs Participe à des comités de développement de guides stratégiques de gestion de la douleur et des soins palliatifs

Pharmacologie :

Schématise l'évolution souhaitée de connaissances pharmacologiques, primordiales à une pratique autonome et qualifiée en Réanimation-Anesthésie

Pharmacologie

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre une connaissance de base en pharmacologie relative à l'anesthésie-réanimation : drogues vasoactives, sédatives, hypnotiques, analgésiques, immunothérapies, antibiotiques	Reconnaît les applications pratiques des connaissances pharmacologiques mais nécessite un guide de choix de molécules Recours si nécessaire aux avis d'autres spécialités pour assister avec le choix adéquat	Capable avec autonomie relative d'appliquer ou d'ajuster l'approche pharmacologique adéquate Reconnaît les interactions médicamenteuses particulières et assure la gestion des effets indésirables	Maitrise la dimension pratique des connaissances pharmacologiques Développe des moyens pratiques pour exploiter les interactions médicamenteuses afin de réduire les effets indésirables	Sert de conseiller pour la prise en charge pharmaceutique des patientes d'anesthésie réanimation

Évaluation pré-anesthésique :

Schématise l'évolution vers l'autonomie des consultations pré anesthésiques, l'anamnèse, les examens cliniques et paracliniques et le recueil de données

Évaluation pré-anesthésique

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Conduit une anamnèse relative à l'intervention prévue accompagnée d'un examen clinique orienté et passe en revue les examens paracliniques réalisés puis synthétise, de façon organisée, les renseignements cliniques pour les présenter à un superviseur qui encadre l'interprétation et la prise de décision anesthésique Nécessite une orientation pour mieux cibler l'anamnèse Documente la consultation ainsi que le consentement et examine les dossiers précédents du patient	Réalise une évaluation clinique ciblée et complète la prescription des explorations paracliniques en accord avec les indications du département Nécessite une incitation à soulever les éléments indiquant une exploration plus approfondie Initie l'interprétation anesthésique et recours à l'encadrement pour prise de décisions	Réalise et interprète une évaluation clinique ciblée associée aux examens para cliniques appropriés Peut nécessiter plus d'incitation à prescrire des explorations inhabituelles en dehors des indications du département Mène avec autonomie relative le processus de préparation et de prise de décisions en tenant compte de l'urgence clinique de la situation et la disponibilité des ressources	Réalise et interprète, avec autonomie, une évaluation clinique ciblée en temps utile, pour l'éventail des situations cliniques en anesthésiologie Mène avec autonomie le processus de décision ainsi que l'indication d'explorations plus approfondies Soulève les comorbidités et les résultats de l'évaluation clinique et paraclinique prévoyant la survenue de complications d'anesthésie	Réalise une évaluation clinique ciblée et globale soulevant des problèmes de santé non diagnostiqués auparavant Présente une claire stratification de risques d'anesthésie résumant tous les éléments pertinents et leurs relations cause-effet avec les risques ou complications en question Participe au développement du Protocole de l'évaluation des patients en anesthésie

Planification de la prise en charge anesthésique et gestion de la douleur :

Schématise l'évolution vers l'autonomie de planification des interventions anesthésiques, gestion de douleurs et en fixe des objectifs à partir des données de l'évaluation

Planification de la prise en charge anesthésique et gestion de la douleur

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît les divers éléments d'un plan de prise en charge anesthésique en spécifiant un ordre prioritaire d'exécution centré sur le patient Énumère les stratégies de gestion de la douleur adaptées aux ressources institutionnelles	Élabore un plan de prise en charge anesthésique centré sur le patient, englobant la surveillance peropératoire, le type de l'anesthésie, le recours aux produits sanguins, le suivi postopératoire ainsi qu'un plan de gestion de la douleur, tout en suivant les guides pratiques institutionnels Peut nécessiter plus d'incitation à planifier une marge pour l'adaptation aux événements imprévus et la gestion des risques associées à l'anesthésie Recours à l'encadrement pour gérer des patients avec des comorbidités importantes	Élabore, avec autonomie relative, un plan de prise en charge anesthésique assurant la marge sécuritaire devant des problèmes d'induction, du maintien, du réveil, et la gestion de la douleur Recours à l'encadrement pour gérer des patients avec des comorbidités importantes mal-contrôlées	Élabore, avec autonomie et face à des patients avec des comorbidités importantes et mal-contrôlées, un plan de prise en charge anesthésique, qui intègre tous les résultats de l'évaluation pour assurer la prévision et la gestion des problèmes liés à l'induction, au maintien et au réveil de l'anesthésie, et la gestion de la douleur. Fixe des cibles hémodynamiques précises et adaptées face à des instabilités hémodynamiques ou une cardiopathie importante	Développe des stratégies pour réduire les complications immédiates et tardives d'anesthésie Élabore des plans d'anesthésie face à des présentations prévoyant la résistance aux protocoles classiques d'anesthésie ou d'analgésies (ex : Notion de toxicomanie, recours courants aux derniers paliers d'analgésie) Développe et adapte les guides pratiques en anesthésie en fonction des ressources fournies par l'institution et leurs disponibilités

Gestion du per-opératoire :

Schématise l'évolution vers l'autonomie de la mise en œuvre des plans conçus, la surveillance et l'adaptation en peropératoire

Gestion du per-opératoire

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Assiste la mise en œuvre du plan anesthésique : l'induction, la maintenance et le réveil de l'anesthésie ainsi que la gestion de douleur associée Assiste la gestion d'une émergence ou autre évènements imprévus en peropératoire	Assure avec autonomie relative, la mise en œuvre d'un plan anesthésique conçu pour la gestion d'une intervention simple et face à des comorbidités minimes Démontre une succession d'étapes compatible avec l'ordre prioritaire d'exécution Assure la gestion d'évènements ou changements physiologiques peropératoires prévus avec recours minimal à l'encadrement ou collègues seniors	Assure avec autonomie relative, la mise en œuvre d'un plan anesthésique conçu pour la gestion d'un patient avec des comorbidités importantes Assure une surveillance optimale peropératoire visée à guetter les changements physiologiques et le diagnostic précoce des événements peropératoires imprévus mais pouvant solliciter l'encadrement ou collègues seniors pour les gérer Réussit une communication efficace des évènements imprévus avec le médecin opérateur et le reste de l'équipe en peropératoire	Assure avec autonomie, la mise en œuvre d'un plan anesthésique conçu pour la gestion d'un patient avec des comorbidités importantes multiples et mal contrôlées Assure avec autonomie, l'anticipation des évènements imprévus ainsi que l'adaptation efficace en peropératoires du plan anesthésique selon leurs impacts sur le déroulement opératoire et la récupération post opératoire Renseigne le médecin opérateur sur les données ou évènements pouvant influer la prise de décision en peropératoire	Assure la gestion des évènements rares ou inexplicables en peropératoires Développe des chemins pratiques à travers les altérations des données de surveillance menant à l'anticipation efficace des évènements imprévus ou à limiter leurs récurrences en peropératoires Conjecture et avise le médecin opérateur sur une association possible entre la récurrence des évènements indésirables et certaines pratiques en peropératoires

Gestion des voies aériennes :

Schématise l'évolution vers la gestion des voies aériennes difficiles

Gestion des voies aériennes

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Réalise une évaluation initiale des voies aériennes Effectue la ventilation par BAVU sur des voies aériennes régulières Connaît les protocoles d'intubation difficile	Élabore un plan et prépare l'équipement et le matériel nécessaires pour la prise en charge des voies respiratoires. Reconnaît une ventilation non invasive insuffisante nécessitant l'intervention de collègues plus expérimentés. Reconnaît les critères d'une extubation sécuritaire	Reconnaît les patients chez qui la ventilation risque d'être difficile ainsi que les états pathologiques susceptibles de compliquer l'intubation et élabore avec autonomie relative un plan pour sa gestion Élabore, avec autonomie relative, un plan sécuritaire d'extubation avec des soins post-opératoires associées	Synthétise, à partir de l'anamnèse et des connaissances sur l'anatomie des voies respiratoires, si on envisage une intubation ou une ventilation au masque difficile et met en œuvre un plan de ventilation efficace avec autonomie	Assure le rôle de conseiller en matière de gestion des ventilations difficiles Développe des guides pratiques visant à diminuer les lésions occasionnées par les tentatives d'intubation répétées

Explorations échographiques :

Schématise l'évolution vers l'autonomie des explorations échographiques

Explorations échographiques

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre les connaissances cliniques et terminologiques de base, essentiels à l'exploration échographique en anesthésie, réanimation, urgences et médecine péri-opératoire. Démontre une bonne orientation anatomique lors des initiations à l'échographie d'urgence et assure la documentation des explorations réalisées Recourt à l'encadrement pour la prise d'abords vasculaires échoguidés	Installe avec autonomie relative le matériel et les réglages adéquats à l'exploration Obtient avec autonomie relative des images de qualité convenable et assure l'interprétation de présentations typiques des tableaux courants (exemple : hypovolémie, insuffisance ventriculaire et la tamponnade lors de l'échocardiographie Trans thoracique)	Distingue les structures anatomiques plus fines ainsi que les présentations plus particulières (exemple : épanchement minime, etc...) et signale avec autonomie la nécessité de la consultation auprès du service spécialisé Assure avec autonomie relative la prise d'abords vasculaires échoguidées	Choisit le matériel adéquat et Manipule avec autonomie les réglages afin d'optimiser la qualité d'image Assure avec autonomie l'exploration échographique d'urgence ainsi que les abords vasculaires échoguidées difficiles en situations de crises	Explore l'apport supplémentaire des nouvelles approches de l'échographie en anesthésie, réanimation, urgences et médecine péri-opératoire ainsi que l'utilité de leur adoption sur le niveau institutionnel

Gestion du post-opératoire :

Schématise l'évolution vers l'autonomie de la gestion du réveil et les complications pouvant être y associées ainsi que le transfert de soins

Gestion du post-opératoire

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Assiste au déplacement sécuritaire des patients vers la salle de réveil Assiste au réveil de l'anesthésie et à la prise en charge des complications post opératoire immédiates ainsi que la gestion de douleur post-opératoire Assure le transfert en unité de réanimation ou la décharge des patients, si décidée, vers les services d'hospitalisation (ordonnances, niveau de soins, renseignements de soins…)	Assure le diagnostic et la prise en charge des complications post-opératoires communes, recours à l'encadrement pour la gestion de présentations atypiques et les retards de réveil Démontre une compréhension d'options de décharge et indique le transfert en réanimation face aux présentations franches Assure (toutefois possible) un suivi post anesthésique tardif selon les ressources institutionnelles allouées	Assure avec autonomie relative, le diagnostic et la gestion des complications post-opératoires atypiques et les retards de réveil Développe une conscience situationnelle des spécificités de l'intervention et des comorbidités associées, imposant le suivi en unité de réanimation ainsi que les spécificités de décharges qui en découlent	Assure le diagnostic et la gestion des complications post-opératoires tout en soulevant si l'étiologie découle plutôt de l'intervention que de l'anesthésie Mène avec autonomie la prise de décision de décharge ou du transfert en unité de réanimation	Participe au développement d'un « Mapping » étiologique des complications post-opératoires visé à familiariser les présentations atypiques, leurs diagnostics et leurs gestions ainsi que la limitation des récurrences Participe au développement de critères spécifiques à la désignation du niveau de soins compatibles avec les ressources institutionnels

Société Marocaine d'Anesthésie, d'Analgésie et de Réanimation
Moroccan Society of Anesthesia, Analgesia and Critical Care

Anesthésie et analgésie locorégionale

Schématise l'évolution vers l'autonomie de pratique sécuritaire de l'anesthésie régionale

Anesthésie et analgésie locorégionale

Phase 1	Phase 2	Phase 3	Phase 4	
Applique les connaissances sur l'anatomie aux techniques d'anesthésie et analgésie locorégionale Démontre une préparation efficace à l'intervention (matériel, positionnement...) Identifie des complications potentielles de l'anesthésie et analgésie locorégionale	Énumère les indications, les contre-indications absolues et relatives, et les risques des anesthésies et analgésies locorégionales Réalise un bloc nerveux périphérique sous encadrement Identifie les complications découlant de l'anesthésie locorégionale et recours à l'encadrement pour la prise en charge adéquate	Choisit, avec autonomie relative, la procédure d'anesthésie locorégionale la plus appropriée en tenant compte des lignes directrices locales du patient Réalise un bloc nerveux périphérique en un laps de temps raisonnable avec autonomie relative en recourant à l'encadrement face à des difficultés imprévues ou un nombre de tentatives nuisible à la sécurité du patient Identifie les complications découlant de l'anesthésie locorégionale et initie la prise en charge adéquate avec autonomie relative	Réalise, avec autonomie, un bloc nerveux périphérique issu d'un plan spécifique au patient tenant compte des facteurs de risque, du tableau clinique et de l'évaluation, dans un laps de temps raisonnable Identifie et prend en charge avec autonomie les complications découlant de l'anesthésie locorégionale Identifie les événements touchants la sécurité des patients et apporte les correctifs nécessaires à sa technique	Sert de conseiller en matière d'anesthésie et analgésie locorégionale ainsi que la gestion des complications y associées Participe à l'amélioration des techniques d'anesthésie et analgésie locorégionale pour des résultats plus optimisés en urgence, en péri-opératoire et en gestion de la douleur chronique Utilise les événements indésirables touchant la sécurité des patients résultants de pratiques itératifs au sein du département pour l'amélioration continue du Protocole institutionnel

Développement des connaissances médicales et activités d'érudition :

Trace un chemin vers une responsabilité d'érudition assurée par tout médecin réanimateur anesthésiste dans l'effort continu de pousser les frontières scientifiques de la pratique

Souligne l'évolution souhaitée d'une connaissance basique de la physiopathologie de base vers une exploitation autonome voir un enrichissement de ces connaissances

Développement des connaissances médicales et activités d'érudition

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre des connaissances de base en physiopathologie et pharmacologie des affections de soins intensifs Consulte la littérature recommandée face à des difficultés spécifiques Participe aux conférences de spécialité et autres activités éducatives Établit des objectifs d'apprentissage du court et long terme	Démontre la capacité d'exploiter la compréhension du processus physiopathologique en pratique courante Développe une lecture critique de la littérature existante et comprend ses limites ainsi que l'intérêt des données probantes dans l'amélioration de la pratique Choisit des expériences d'apprentissage appropriées à explorer ses propres déficits Développe avec assistance un plan d'apprentissage qui vise le développement autonome de connaissances	Fait progresser ses connaissances médicales avec des activités d'érudition Participe à une activité d'érudition qui répond à une question de recherche ciblée dans le cadre de la spécialité Adopte une approche pratique fondée sur l'intégration de données probantes et l'expertise clinique Développe avec autonomie, son propre plan d'apprentissage autonome et continu	Initie des travaux d'érudition et participe au développement de protocoles fondés sur l'approche des preuves probantes visés à mieux rapprocher les connaissances médicales au pratiques cliniques et optimiser les soins Identifie les occasions d'apprentissage et d'amélioration en évaluant son rendement d'une manière réflexive à l'aide de données de sources diverses Exploite la lecture critique d'une revue de littérature pour choisir les méthodes appropriées afin de mieux répondre à une question de recherche	Assure la dissémination des connaissances dans les conférences régionaux et locaux ou à travers des publications Participe à des activités d'érudition évaluées par les experts, communique leurs résultats et la valeur réelle de leurs intégrations dans un Protocole de soins Promeut les activités d'érudition et présente des guides pratiques pour faciliter leurs réalisations Promeut l'auto-évaluation et facilite la conception de plans d'apprentissage

Communication avec patients, familles et proches aidants :

Trace un chemin vers une communication efficace et autonome avec les patients pris en charge, leurs familles et proches aidants

Trace un chemin qui mène la communication de la phase de transmission basiques des données relatives à a prise en charge à une phase de gestion des difficultés de communication et des situations de conflits pour différents contextes culturels

Communication avec patients, familles et proches aidants

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Communique sous encadrement avec le patient, sa famille et ses proches aidants et transmet des informations au sujet de l'évolution médicale et du plan de prise en charge avec clarté et précision en faisant preuve de compassion et de respect Utilise un langage approprié et exempt de jargon médical pour assurer la compréhension et affirmer le consentement de la famille et des proches aidants Reconnaît les situations où la communication nécessite l'intervention d'un autre individu ou l'assistance des ressources fournies par l'institution (membres de l'équipe, traducteur, psychiatre...)	Répond aux questions du patient, de sa famille et de ses proches aidants au sujet des prochaines étapes Identifie les situations de conflits familiales répercutants sur l'adhésion et la poursuite de soins Offrir l'assistance en respectant les limites du milieu socio-économique, du sexe, de la religion et des croyances culturelles Exploite efficacement l'assistance des ressources fournies par l'institution pour optimiser la communication Documenter la rencontre clinique pour qu'elle reflète fidèlement la discussion et les décisions	Gère avec autonomie relative les situations de conflits complexes nécessitant la communication avec des individus des milieux socio-économiques et des croyances culturelles différents Reconnaît la responsabilité d'expliquer l'origine de résultats cliniques imprévus et divulgue les événements indésirables aux patients, sa famille et ses proches aidants	Gère avec autonomie les situations de conflits complexes nécessitant la communication avec des individus des milieux socio-économiques et des croyances culturelles différents Adresse les patients qui perçoivent que le fardeau associé au traitement ou aux examens est plus grand que les bienfaits cliniques pouvant en découler Être conscient de l'option du don d'organes et de tissus dans le cadre des discussions de fin de vie avec les proches du patient Explique les résultats cliniques imprévus et divulgue les événements indésirables aux patients, sa famille et ses proches aidants	Développe des modèles de communication inter culturelles Établit des relations de confiance thérapeutique avec les patients et leurs familles et leurs proches aidants, adéquates avec le rôle de conseiller Annonce, au patients et leurs familles et proches aidants, les erreurs médicales influant le parcours des soins ainsi que les complications imprévues dans les normes définies par l'institution

Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins :

Trace un chemin vers une cohérence avec le système de santé

Souligne l'évolution souhaitée vers une position de direction au sein de l'équipe de soins

Souligne l'évolution souhaitée de la coordination efficace dans le cadre institutionnel ainsi que la collaboration avec les différentes ressources du système de santé

Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Communique les tâches aux autres membres de l'équipe de soins avec un langage clair en les adressant personnellement avec une manière d'identification appropriée Fait preuve du respect et fiabilité nécessaire pour réussir la communication et la collaboration avec l'équipe de soins ou en inter disciplinaire Recourt souvent l'encadrement pour une collaboration efficace Démontre une compréhension des procédures de coordination et transfert sécuritaire de soins et assure leurs exécutions planifiées et indiquées par l'encadrement Assure la documentation exhaustive des problèmes pris en charge qui facilite le suivi et la continuité de soins (observation médicale, feuille d'anesthésie ….)	Connaît les champs de pratique des professionnels du domaine de soins intensifs et fait appel à leur expertise pour concevoir des plans de soins cliniques lorsque les opinions ou les recommandations divergent Travaille efficacement avec le professionnel de première ligne et interprète l'information clinique recueillie et les résultats d'examens paracliniques réalisés pour mieux orienter le diagnostic ainsi que le plan de soins Recourt à l'encadrement, pour une collaboration jugée efficace pendant les situations compliquées Planifie la logistique du transfert principalement en intra hospitalier y compris la stabilisation et les procédures préalables au transfert, les exigences en matière d'équipement et de personnel, les méthodes de surveillance et l'évaluation durant le transport	Adopte une communication en boucle fermée Confie des tâches et dirige les membres de l'équipe pendant les efforts de réanimation et supervise leurs réalisations Indique et organise avec autonomie relative, un transfert sécuritaire des soins, à la fois verbalement et par écrit, durant la transition d'un patient vers une nouvelle structure de soins, un nouveau professionnel de santé ou une nouvelle étape de prestation des soins Collabore, avec autonomie relative avec les autres professionnels de la santé pour mettre en place une approche multidisciplinaire aux soins	Démontre un rôle modèle de direction efficace de l'équipe de soins et de coordination interdisciplinaire Assure un rôle consistant de leader lors des situations complexes Intervient et assiste ses collègues juniors face à des résultats cliniques imprévus et communique de manière délicate lorsque la bonne gestion dépasse leurs acquis Décide avec autonomie, le niveau de soins et les moments opportuns pour les transitions de soins et collabore avec des autres professionnels de santé pour assurer la continuité des soins Collabore efficacement avec le circuit institutionnel impliqué dans la coordination du don d'organes	Développe des moyens de communication rapide pour optimiser le travail d'équipe ainsi que des méthodes de transition de soins qui assure et optimise les bénéfices de continuité de soins Conduit des débriefings suite à des événements critiques visant à discuter l'approche de soins et traiter les difficultés de communication Participe à la résolution des conflits et malentendus entre les membres de l'équipe de soins

Adoption d'une déontologie professionnelle :

Trace un chemin vers l'acquisition d'un profil déontologique requis pour une pratique sécuritaire dans un domaine de soins bordés par plusieurs défis éthiques

Souligne une évolution souhaitée de déontologie professionnel de la phase de devoir vers un système de valeurs professionnelle primordiale pour renforcer la confiance publique en notre système de santé

Adoption d'une déontologie professionnelle

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Nécessite d'être incité à respecter l'engagement à l'égard de la sécurité des patients et de rapporter les évènements indésirables Satisfait l'obligation de déclaration des maladies transmissibles et les soupçons de violence familiale ou de maltraitance Fait preuve d'une attitude et présentation vestimentaire professionnelle et appropriée Démontre une compréhension de l'utilité des principes du bien être associés à la responsabilité de maintenir un rendement professionnel Assume les responsabilités confiées convenablement lors des situations de routine ainsi que la responsabilité à l'échec de leur complétion	Résume les particularités du patient et reconnaît les événements touchants à la sécurité en temps opportun Se voue à l'excellence de la pratique et réponds aux avis sollicités avec précision et ponctualité Établit la balance nécessaire à une meilleure coordination entre la vie personnelle et les responsabilités professionnelles Avoue son inaptitude menant à l'exemption de certaines taches ou certaines responsabilités, à défaut de laquelle est revendiqué souvent un manque franc de professionnalisme	Met à profit son expertise médicale pour établir une relation cause-effet face à des erreurs humaines et des détériorations imprévues et repère les possibilités d'amélioration de la qualité des soins Adopte un comportement exemplaire lors des situations complexes faisant preuve de responsabilité envers les patients, la société et la profession Intervient lorsque des conflits interpersonnels ou des comportements envers des collègues ou des apprenants nuisent à un environnement de respect Communique appropriement les inquiétudes entourant certaines structures du système et contribue à proposer des substituts	Développe une prévision des événements indésirables face à des circonstances spécifiques et emploi des stratégies de prévention Signale les erreurs médicales conformément aux processus de l'établissement Gère les dilemmes éthiques soulevés en milieu clinique Participe aux programmes d'optimisation de compétences, de sécurité de soins et participe aux comités et activités départementales Satisfait aux normes de pratique professionnelle et agit comme modèle de rôle positif Instruit ses collègues juniors au sujet de gestion émotionnelle et bien-être dans un effort pour atténuer l'impact de l'épuisement physique et émotionnel sur la sécurité des patients	Construit un recensement des compétences requises pour exercer en toute sécurité et de manière efficace, et encourage tous les membres de l'équipe à y conformer et à l'améliorer Lance des initiatives liées à la sécurité des patients et à l'amélioration de la qualité des soins et indique la nécessité d'ajuster certaines pratiques qui aggravent le débat éthique ou entravent la complétion efficace de taches, malgré leurs validations institutionnelles Participe à des comités nationaux de développement du profil professionnel à référencier

Éducation et encadrement des membres de l'équipe de soins :

Trace un chemin vers un rôle actif dans la dissémination du savoir pratique vers l'équipe d soins dans l'effort continu de l'amélioration de la qualité prise en charge par l'élimination des lacunes

Éducation et encadrement des membres de l'équipe de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît la valeur de partager les connaissances et le savoir-faire avec les autres membres de l'équipe de soins Assiste avec l'encadrement des étudiants en santé en expliquant les plans de soins	Explique le processus décisionnel et le plan de soins en résultant, avec encadrement Repère les besoins d'apprentissage et démontre la disponibilité nécessaire pour répondre aux interrogations des collègues juniors et autres membres de l'équipe de soins	Joint les descriptions du processus décisionnel et du plan de soins avec des commentaires explicatifs et des questions d'apprentissage qui tiennent compte de l'incertitude et des lacunes afin de renforcer le processus d'apprentissage Indique les comportements des apprenants à encourager ou à conserver ainsi que ceux à améliorer Coordonne avec autonomie relative des séances d'apprentissage au raisonnement clinique (ARC) en faveur des collègues juniors et étudiants en médecine	Évalue et reconnaît les lacunes spécifiques à un membre de l'équipe et encourage activement à remédier, en fournissant des suggestions précises pour l'amélioration et en attribuant des tâches et des responsabilités autour de la lacune en question Identifie les situations cliniques non sécuritaires mettant en cause les apprenants et met en œuvre les provisions nécessaires Participe à la préparation des présentations ou publications dans le but de disséminer l'information	Présente un modèle à suivre en matière d'éducation et encadrement en créant un milieu d'apprentissage stimulant Élabore les objectifs d'apprentissage afin d'optimiser les soins et mettre en œuvre un plan d'apprentissage adapté Présente ses apprenants avec des évaluations régulières et spécifiques et la rétroaction nécessaire pour améliorer l'apprentissage et le rendement

Feedback professionnel :

Schématise l'évolution souhaitée des feedback professionnels

Feedback professionnel

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Sollicite un feed-back constructif auprès des collègues et encadrants	Fournit des feedbacks constructifs aux collègues juniors et aux étudiants d'une façon respectueuse Sollicite et accepte le feedback des collègues et incorpore les suggestions dans l'approche pratique	Sollicite des feedbacks de sources et d'utilité variées (Membre de l'équipe de soins, patients...) Sollicite et fournit des feedbacks constructifs dans des situations délicates (résistance au feedback, résultats divergents possibles, feedback pour un praticien plus expérimenté)	Fournit des feedbacks constructifs et spécifiques aux membres de l'équipe de soins visant à améliorer le processus d'auto-évaluation	Établit une corrélation entre les feedbacks et l'auto-évaluation pour améliorer l'approche pratique et optimiser les soins

Économie de santé et coûts de soins :

Souligne l'évolution souhaitée vers une considération efficace des couts de soins et leur considération dans la conception des plans de soins

Société Marocaine d'Anesthésie, d'Analgésie et de Réanimation
Moroccan Society of Anesthesia, Analgesia and Critical Care

Économie de santé et coûts de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Nécessite souvent des incitations à considérer les coûts associés aux soins (médicaments, matériel, bilans...) Nécessite souvent une orientation pour reconnaître les moyens pour réduire les coûts des soins	Démontre une compréhension des principes généraux de l'économie de santé Commence avec orientation à établir la balance des coûts-bénéfices et son implication sur le plan de soins Nécessite l'encadrement pour assurer la gestion des ressources limitées fournies par l'institution	Démontre une conscience du fardeau des coûts de soins et intègre la balance coûts-bénéfices dans la formulation de plans de soins Favorise des options thérapeutiques dont les procédures de remboursement sont simples et équitables Capable avec autonomie relative, de gérer les ressources institutionnelles limitées selon l'ordre de priorité	Formule ou ajuste avec autonomie des plans de soins prenants compte de la balance coûts -bénéfices Participe régulièrement à des programmes visés à réduire les coûts tout en maintenant l'efficacité des soins	Développe des stratégies de coordination entre les ressources institutionnelles et personnelles du patient pour réduire les coûts de soins Sensibilise l'équipe de soins sur le risque d'un fardeau financier pour la poursuite des soins Participe à la restructuration des régimes d'assistance médicale (AMO...)

III. Critical Care and Anesthesiology Competency Dictionary:

This "Profil du métier", is the final version of the competency dictionary agreed by the board, displayed as designated by MBACC:

Moroccan Board of Anesthesiology and Critical Care

Collège Marocain d'Anesthésiologie et de Réanimation

Référentiel des Compétences : Profil du Métier Médecin Anesthésiste-Réanimateur

1. Évaluation des patients et développement des plans de soins :

- Évalue et identifie les différentes présentations cliniques courantes et atypiques et indique les différents examens paracliniques adéquats.
- Etablit l'ordre d'urgence et l'ordre de priorité.
- Développe un plan de soins complet ainsi qu'un plan d'évaluation continue.
- Adapte les plans des soins au fil de l'évolution de l'état de patient.
- Sollicite les avis des collègues et autres spécialistes afin d'optimiser la prise en charge
- Utilise les ressources limitées d'une manière judicieuse au moment de crises.

2. Gestion d'événements aigus et dysfonctions d'organes :

- Anticipe et gère les événements aigus, les états de chocs et les défaillances d'organes.
- Agit pour minimiser les conséquences d'une défaillance d'organe multi systémique.
- Démontre une capacité de gestion face à un flux de patients critiques et maintient un contrôle des situations de crise.
- Assure la gestion des ressources vitales limitées en situations de crise et assume la responsabilité de leur allocation à des patients jugés ayants plus de chances de survie.
- Reconnaît les circonstances de cessation des efforts de réanimation.

3. Habilités procédurales pratiques et interprétations :

- Indique et Installe des mesures de monitorage basique et avancé (cathéters artériels, cathéters veineux centraux, techniques hémodilution, cathéterisation artère pulmonaire, ...).
- Fournit une interprétation contextuelle des données.
- Développe une planification des interventions avancées (Drainage thoracique, cricothyroidotomie, bronchoscopie …) qui assure l'exécution avec fluidité et économie des mouvements tout en préservant les tissus mous.
- Reconnaît les dysfonctionnements de l'équipement et les solutions provisoires visées à assurer la continuité de l'intervention.
- Participe à la formation continue en matière de méthodes de monitorage avancées.

4. Gestion respiratoire en unité de réanimation :

- Reconnait et évalue la présentation de l'insuffisance respiratoire ainsi que ses implications systémiques et met en œuvre un plan de gestion adéquat.
- Maitrise les méthodes de ventilation variées ainsi que les interventions éventuellement associées (trachéotomie, oxygénation par membrane extracorporelle…).

5. Douleurs, Soins palliatifs et soins de fin de vie :

- Établit, exécute et adapte des plans de soins palliatifs faisant preuve de la flexibilité nécessaire face aux fardeaux culturels et moraux ainsi que l'évolution de la complexité et de l'incertitude associées aux soins de fin de vie.
- Facilite l'accès aux ressources d'accompagnement.
- Choisit les moyens pharmacologiques et les interventions thérapeutiques nécessaires à la gestion de la douleur (aigue et chronique) et aux soins palliatifs.
- Applique les directives concernant l'établissement du diagnostic de mort cérébrale.
- Identifie les occasions de don d'organes, documente l'évaluation et la discussion relative au don d'organes et élabore des plans pour maintenir l'homéostasie du donneur.

6. Pharmacologie :

- Démontre des connaissances en pharmacologie relative à l'anesthésie-réanimation (drogues vasoactives, sédatives, hypnotiques, analgésiques, immunothérapies, antibiotiques…) et maitrise la dimension pratique de ces connaissances.
- Reconnait et assure la gestion des effets indésirables.
- Exploite les interactions médicamenteuses afin de réduire les effets indésirables.

7. Évaluation Pré-anesthésique:

- Réalise et interprète une évaluation clinique ciblée en temps utile associée aux examens para cliniques appropriés, pour l'éventail des situations cliniques en anesthésiologie.
- Soulève les comorbidités et les résultats prévoyant la survenue de complications d'anesthésie.
- Mène le processus de décision ainsi que l'indication d'explorations plus approfondies en tenant compte de l'urgence de la situation et la disponibilité des ressources.

8. Planification de la prise en charge anesthésique et gestion de la douleur :

- Élabore un plan de prise en charge anesthésique, qui intègre tous les résultats de l'évaluation pour assurer la prévision et la gestion des problèmes liés à l'induction, au maintien et au réveil de l'anesthésie, et la gestion de la douleur.
- Élabore un plan de prise en charge anesthésique admettant une marge sécuritaire adéquate aux patients avec des comorbidités importantes et mal-contrôlées.
- Fixe des cibles hémodynamiques précises et adaptées face à des instabilités hémodynamiques ou une cardiopathie importante.

9. Gestion du per-opératoire :

- Assure la mise en œuvre d'un plan anesthésique conçu pour la gestion d'une intervention chez des patients avec des terrains variés de comorbidités.
- Démontre une succession d'étapes compatible avec l'ordre prioritaire d'exécution.
- Assure une surveillance optimale péri-opératoire visée à l'anticipation des évènements imprévus ainsi que l'adaptation efficace en péri-opératoires du plan anesthésique selon leurs impacts sur le déroulement opératoire et la récupération post opératoire.
- Renseigne le médecin opérateur sur les données ou évènements pouvant influer la prise de décision en périopératoire.

10. Gestion des voies aériennes:

- Réalise l'anamnèse et l'évaluation anatomique des voies respiratoires, et synthétise si on envisage une intubation ou une ventilation au masque difficile.
- Met en œuvre un plan de ventilation efficace.
- Élabore un plan sécuritaire d'extubation avec des soins post-opératoires associées.

11. Explorations échographiques :

- Assure l'exploration échographique en anesthésie, réanimation, urgences et médecine péri-opératoire.
- Choisit le matériel adéquat et Manipule les réglages afin d'optimiser la qualité d'image.
- Interprète les présentations pathologiques typiques et particulières.
- Sollicite la consultation auprès du service spécialisé.
- Assure les abords vasculaires échoguidés difficiles en situations de crises.

12. Gestion du post-opératoire :

- Assure le diagnostic et la gestion des complications post-opératoires et les retards de réveil tout en soulevant si l'étiologie découle plutôt de l'intervention que de l'anesthésie.
- Mène la prise de décision de décharge ou du transfert en unité de réanimation selon une conscience situationnelle des spécificités du patient, de l'intervention et des spécificités de soins en post-opératoire et en post-décharge.

13. Anesthésie et Analgésie locorégionale :

- Réalise une anesthésie ou une analgésie locorégionale à partir d'un plan spécifique au patient tenant compte des indications, des facteurs de risque, et de l'évaluation, dans un laps de temps raisonnable.
- Identifie et prend en charge les complications découlant de l'anesthésie locorégionale.
- Identifie les événements touchants la sécurité des patients et apporte les correctifs nécessaires à sa technique.

14. Développement des connaissances médicales et activités d'érudition :

- Identifie les occasions d'apprentissage et d'amélioration et développe son propre plan d'apprentissage autonome et continu.
- Initie des travaux d'érudition qui répondent à des questions de recherche ciblée dans le cadre de la spécialité.
- Exploite la lecture critique d'une revue de littérature pour choisir les méthodes appropriées afin de mieux répondre à une question de recherche.
- Participe au développement de protocoles fondés sur l'approche des preuves probantes visées à mieux rapprocher les connaissances médicales au pratiques cliniques et optimiser les soins.

15. Communication avec patients, familles et proches aidants :

- Utilise un langage approprié et exempt de jargon médical pour assurer la compréhension et affirmer le consentement de la famille et des proches aidants.
- Documente la rencontre clinique pour qu'elle reflète fidèlement la discussion et les décisions.

- Gère les situations de conflits complexes nécessitant la communication avec des individus des milieux socio-économiques et des croyances culturelles différents.
- Discute de l'option du don d'organes et de tissus dans le cadre des discussions de fin de vie avec les proches du patient.
- Explique les résultats cliniques imprévus et divulgue les événements indésirables aux patients, sa famille et ses proches aidants.
- Exploite efficacement des ressources visées à optimiser la communication (membres de l'équipe de soins, traducteur, psychiatre...).

16. Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins :

- Démontre un rôle modèle de direction efficace de l'équipe de soins et de coordination interdisciplinaire.
- Adopte une communication en boucle fermée.
- Assure un rôle consistant de leader lors des situations complexes et assiste ses collègues juniors face à des résultats cliniques imprévus ou lorsque la bonne gestion dépasse leurs acquis.
- Décide le niveau de soins adéquat indiqué et les moments opportuns pour les transitions de soins.
- Organise un transfert sécuritaire des soins, durant la transition d'un patient vers une nouvelle structure de soins, un nouveau professionnel de santé ou une nouvelle étape de prestation des soins, afin d'assurer la continuité des soins.
- Collabore efficacement avec le circuit institutionnel impliqué dans la coordination du don d'organes.

17. Adoption d'une déontologie professionnelle :

- Participe aux programmes, comités et activités départementales d'optimisation de compétences et repère les possibilités d'amélioration de qualité et de sécurité des soins.
- Établit une relation cause-effet face à des erreurs humaines et des détériorations imprévues et développe une prévision des événements indésirables.
- Signale les erreurs médicales conformément aux processus de l'établissement et emploi des stratégies de prévention.
- Se voue à l'excellence de la pratique et réponds aux avis sollicités avec précision et ponctualité.
- Satisfait aux normes de pratique professionnelle et agit comme modèle de rôle positif.
- Gère les dilemmes éthiques soulevés en milieu clinique.
- Démontre une compréhension de l'utilité des principes du bien être associés à la responsabilité de maintenir un rendement professionnel.
- Instruit ses collègues juniors au sujet de gestion émotionnelle et bien-être dans un effort pour atténuer l'impact de l'épuisement physique et émotionnel sur la sécurité des patients.

18. Éducation et encadrement des membres de l'équipe de soins :

- Assiste avec l'encadrement des étudiants en santé.
- Décrit le processus décisionnel et le plan de soins joigné de commentaires explicatifs et de questions d'apprentissage visant des lacunes.
- Coordonne des séances d'apprentissage au raisonnement clinique (ARC).
- Reconnaît les lacunes spécifiques à un membre de l'équipe, lui fournit des suggestions précises pour l'amélioration et lui confie des tâches autour de la lacune en question.

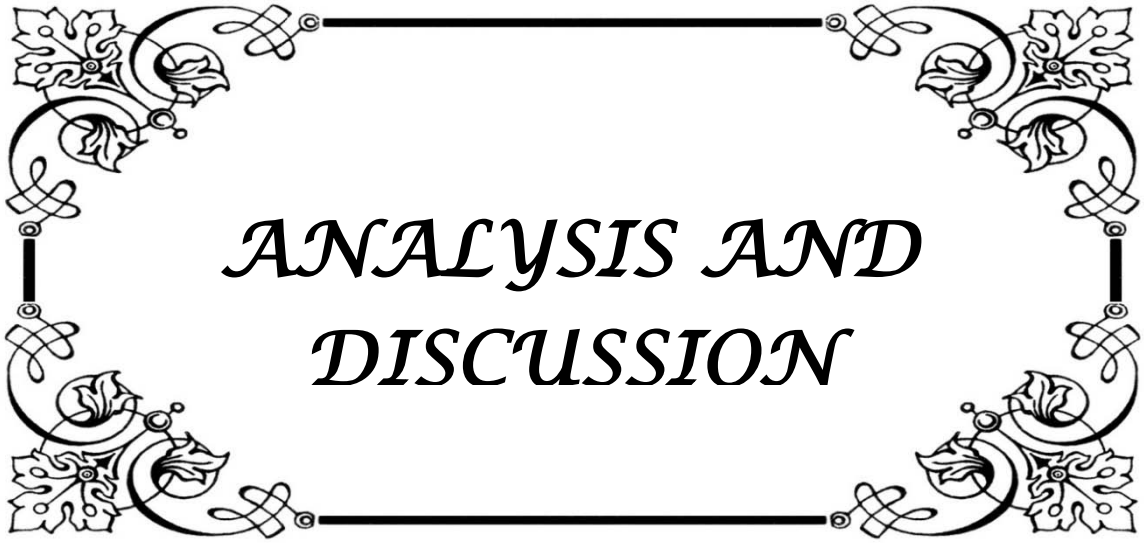
- Identifie les situations cliniques non sécuritaires mettant en cause les apprenants et met en œuvre les provisions nécessaires.
- Participe à la préparation des présentations ou publications dans le but de disséminer l'information.

19. Feedback professionnel:

- Sollicite et fournit des feedbacks respectueux, constructifs et spécifiques visant à améliorer le processus d'auto-évaluation.

20. Économie de santé et coûts de soins :

- Démontre une conscience du fardeau des coûts de soins et formule ou ajuste des plans de soins prenants compte de la balance coûts -bénéfices
- Favorise des options thérapeutiques dont les procédures de remboursement sont simples et équitables.
- Gère les ressources institutionnelles limitées selon l'ordre de priorité.
- Participe régulièrement à des programmes visés à réduire les coûts tout en maintenant l'efficacité des soins.



ANALYSIS AND DISCUSSION

Designing our framework required an outlook on the literature of CBME as it aimed not only at designing a competency-based approach but also at inciting discussion on the idea of competence.

Competency-based medical education CBME is a concept originating from the bigger approach of competency-based education and training or CBET, covering other fields of education.

It is an educational approach conceived over the last century gradually as an attempt to reform or better the existing education process, to try and cover some shortcomings that come with traditional education as well as improve its outcomes.

This relates mainly to the teacher-student interaction dynamic, described in modern reviewing as vertical interaction, where the teacher is an emitter of knowledge towards the receiver, being the student, and the main purpose is the transfer of knowledge in the same unidirectional lane with the teacher deciding the content, the amount and the proper way to assess reception of the transferred knowledge.

This teacher-student interaction model is widely seen as outdated by education scholars and is criticized as a capital shortcoming of traditional education and sometimes an actual hindrance to the learning process.

These shortcomings are very well outlined in a table adapted from the work of Carraccio et al. 2002(11):

A Comparison of the Elements of Structure- and Process-based Versus Competency-based Educational Programs

	Educational Program	
Variable	Structure- and Process-based	Competency-based
Driving force for curriculum	Content—knowledge acquisition	Outcome—knowledge application
Driving force for process	Teacher	Learner
Path of learning	Hierarchical (teacher ⇒ student)	Non-hierarchical (teacher ⇔ student)
Responsibility for content	Teacher	Student and teacher
Goal of educational encounter	Knowledge acquisition	Knowledge application
Typical assessment tool	Single subjective measure	Multiple objective measures ("evaluation portfolio")
Assessment tool	Proxy	Authentic (mimics real tasks of profession)
Setting for evaluation	Removed (gestalt)	"In the trenches" (direct observation)
Evaluation	Norm-referenced	Criterion-referenced
Timing of assessment	Emphasis on summative	Emphasis on formative
Program completion	Fixed time	Variable time

(Shifting Paradigms: From Flexner to Competencies: Carracio et al 2002) (11)

I. Establishing a Historical Continuum of CBME:

1. FLEXNER, the Early Paradigm Shift and the Birth of Modern Medical Education:

Structure and process-based education is the traditional model of education found in many other fields and referred to in medical education as the Flexnerian model, after education scholar ABRAHAM FLEXNER and his reformist report on medical education in the United States and Canada presented to the Carnegie foundation for the advancement of teaching in 1910. (12)

The Flexner report scrutinized heavily the existence of unregulated "commercial medical schools" describing an "enormous overproduction of uneducated and ill-trained medical practitioners", resulting evidently from non-standardized education and curriculums. The perceived deficiency by Flexner regarded practice rather than academics as the notion of a university hospital was not a standard requirement back then, described as: "A hospital under complete educational control is as necessary to medical school as is a laboratory of chemistry or pathology."

This view was largely shared by William Osler, a prominent figure in clinical teaching and widely seen as the father of residency training programs. He is also known for enterprising medicine at the bedside where education exits the limits of the textbooks to cover direct observation and ward visits, a practice in hospital rotations that continues to this day. (13,14)

This marks a point of paradigm shift in the approach of medical training in the United States, as medicine was evolving from a practice based on superstition and tradition into a rational approach.

This imposed what a reformist effort to improve the quality and training of medical trainees, that eventually led to "Structure and process-based education" as it laid the ground for:

- The articulation or conversion of medical schools to proper university departments, based in what was described as "competent universities".
- Necessity of statistical evaluation of the number of required physicians.
- The standardization of the study course period, graduation, material requirement and practical hospital training during the years of study in the united states.
- Taking in consideration the variations in training focus relating to geographic and therefore clinical variations.

Flexner's scathing report incentivized much of the design of educational infrastructure for proper standard medical training, but is not without its critics, ranging from the exclusion of minorities and women of medical studies in the United states, to indirect links to staff shortage in medical doctors in the US in modern times to the view that the report itself in a relic from the past.

However, these do not contravene the fact that Flexner's report was a step in the evolution of medical training that was adequate to its era and social circumstances, and that the main motivation of the call to reform, comes from the need for better trained physicians, or as Flexner stated in his report:

"Colleges and universities have in large measure failed in the past twenty-five years to appreciate the great advance in medical education and the increased cost of teaching it along modern lines."

And "The needs of the public would equally require that we have fewer physicians graduated each year, but that these should be better educated and better trained"

The "needs of the public" is a very fluid variable, progressing through time and has always been associated with change. This change of needs equals evidently a change of objectives and will eventually trigger updates in the paradigm of education making it more suited to serve the new objectives.

Perhaps the only firm and persistent commitment throughout the eras is the ultimate goal of producing better trained and better qualified medical doctors than those present.

And as times changed throughout the last century, needs changed and the paradigm shift in medical education often summons the competency-based approach.

The notion of defining outcomes then redesigning an educational model based on the desired outcome is a concept referred to as outcome-based education and reforms based on this approach are traced all the way back to the sixties of the last century, gaining more and more traction in the seventies and eighties.

Carracio et al 2002 (11) stated they "reviewed the titles and abstracts of the 469 articles the search produced, and chose 68 relevant articles for full review", in resources from the 1960s to 2002, the date the article was released, in an attempt to map a definition of CBME that is subject to most consensus throughout literature, in preparation to what they described as being " on the brink of a major paradigm shift from structure- and process-based to competency-based education and measurement of outcomes".

The new shifting in the paradigm of education came after what was perceived as the process-based education having exhausted much of its improvement capacity.

Process-based education tends to focus on acquiring knowledge through a standardized process consisting of a size fits all path, which students follow, reaching various and discordant end results. This is justifiable by the fact that the basic divergence in human character and reasoning capacities, but mostly patterns of learning, changes the outcome from one individual to the other.

It is only normal that two different subjects put through the same process with subjective goals, might not end up providing the same result of knowledge acquisition, skill improvement, and most importantly for medical education, proficient practical abilities.

This discrepancy in resulting proficiency post-graduation is the main trigger of worry, that process-based education might not be able to provide medical practitioners with a training that fits the needs of the ever-evolving human populace, reflected in a statistic sense by Carraccio and colleagues in 2002 (11) as the "decline in scores of indicators of educational effectiveness such as Student Achievement Tests and classroom examinations".

However, leaning towards CBE wasn't always an evident choice as any curricular modification imposed significant policy change, and with the absence of expert consensus, CBE, being an upset to the current order or possibly resulting in failure, took its toll on the social accountability factor required in educational design.

This however changed as attempts at redesigning the education process based on the desired outcome were being explored. In the context of general education, a significant work shed light on the new approach by William G Spady of the US national institute of education referred to as the father of competency-based education in the US for his work: "Competency Based Education: A Bandwagon in Search of a Definition". (15)

2. Spady, advocating CBE and the early explorations of CBME in the seventies:

Spady defines CBE as "a data-based, adaptive, performance-oriented set of integrated processes that facilitate, measure, record and certify within the context of flexible time parameters the demonstration of known, explicitly stated, and agreed upon learning outcomes that reflect successful functioning in life roles "and assigns six critical elements in his discussion, four of which essential and one of which is the outcomes of CBE.

These outcomes eventually became competencies and what we describe as proficiency, Spady describes as competencies being "indicators of successful performance in life-role activities". These definitions render competencies as the prime movers in framing outcome goals, designing curricula, providing instruction, and measuring student performance.

Spady's definition is a particularly important point in the history of CBE because:

- It lays some ground for consensus between experts on the definition of competency and its elements
- It clarifies how the elements are to be drafted respectively
- It reinforced affinity towards the new approach of CBE as the best way to optimize the results of the process of education.
- It partly sparked more exploration of the subject and actual attempts across several professions to materialize models of CBE and by extension CBME.

As far as materializing CBME models is concerned, several attempts were made at what turned out later to be early embracing of outcome-based education. Carraccio et al 2002 (11) even described it as "establishing guidelines and even edicts for the paradigm shift in the educational institutions ".

These attempts, as described, were institutional in most instances, where separate departments would produce first steps towards adopting CBME in their training programs.

These first steps were usually in the specter of defining competencies, their components such as sub-competencies in several specialties, then providing an amendable method of assessment of said competencies.

This is found in several early works:

- The American Board of Pediatrics' "Foundations for Evaluating the Competency of Pediatricians" published in 1972, specifying the three dimensions of competency as subject matter, abilities and tasks. (16)
- The university of Utah's "A competency-based educational approach to reproductive biology "by Brown TC et al published in 1973 who adopted the following model as published: (17)

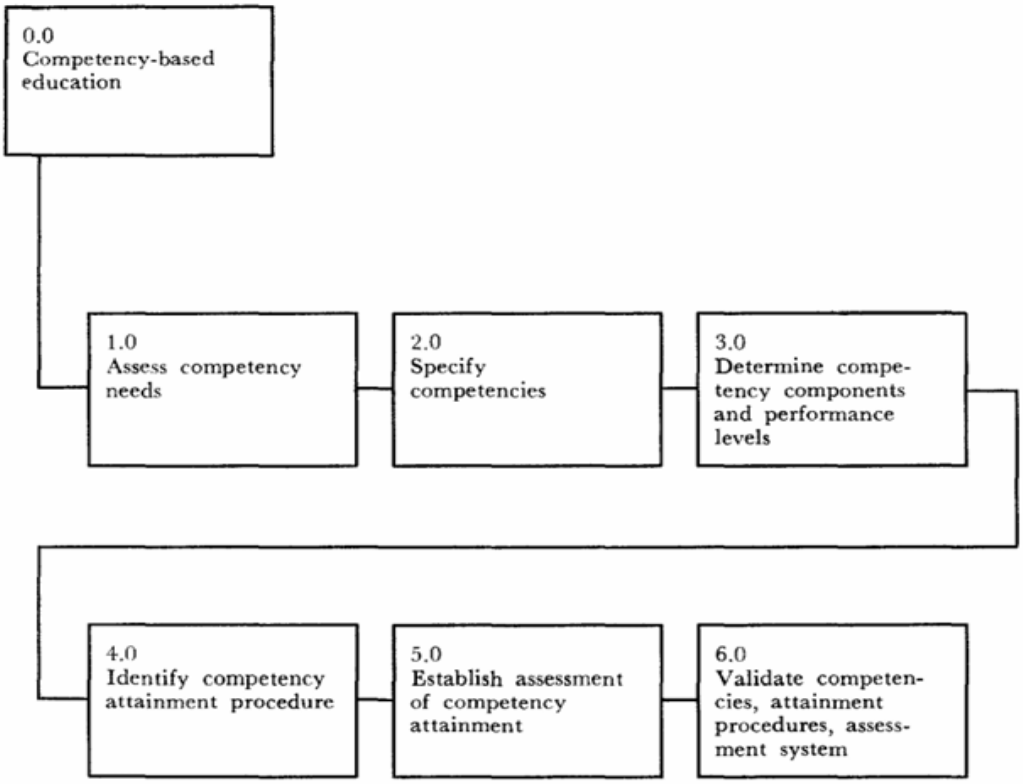


Fig. 1. Generic model for the development of a competency-based educational approach.

- Competency-based psychiatric education by Weinstein HM et al 1975 examining the components of a competency-based residency program. (18)

Sampling These works is not a mere enunciation of examples, works from this early era of adopting CBME took those first steps sometimes in visibly different approaches but they all converge on one notion and one term to describe their very first steps: **a FRAMEWORK** for the development of their education model.

The framework is an essential structure as it enables safe and organized paradigm transitions, it is the very same structure this study to develop and discuss in our context.

3. The WHO's Guideline to Curriculum development in CBME and later explorations of CBME during the eighties and nineties:

Following Spady's work, the recurrent initiatives or as we established: "frameworks" of CBME, and the constant observation of challenges and stagnation in quality improvement of medical services, the WHO adopted a report that solidified Competence as the approach to go further in developing residency and medical education.

McGaghie et al. with the center for educational development, University of Illinois at the Medical Center, Chicago, IL, USA and under the banner of the WHO, published in 1978 (19):

"COMPETENCY – BASED CURRICULUM DEVELOMENT IN MEDICAL EDUCATION",

In which the cause of stagnation in practice quality in western countries and inadequacy topping shortage in developing countries was linked to the stagnation of development of the educational process which was at the time mostly built on process-based approaches referred to by the report as subject-centered curriculum.

This publication re-iterated most of criticisms regarding said process while delineating its effect on practice and indicated that an attempt to improve health care providers' competencies is to reform curriculums mainly along the line of Competency-Based Curriculums.

It established 3 fundamental distinctions for CBME as a separate education paradigm:

- how the "function" or competency needs to be specified then the curriculum designed around it
- that every medical student is capable of mastery in his performance
- that the very process of learning along with teaching is a field compatible with "hypotheses and subject testing"

These fundamentals were developed further, first by establishing their own definition of competency: a process now found constant papers dealing with CBME, particularly the ones contemporaneous with framework design.

It also underlines the components of competency and goes on to provide an explicit inventory of tools that should be used in the drafting of these components:

"Analysis of physicians' activities" using: "self-reports", "observation" and "task analysis": three tools with the purpose of establishing physicians' practices in a certain setting hanging in a balance between empirical field practices and expert consensus.

"Critical elements of behavior" described for its "qualitative" input: "Critical incidents" which are basically recounts of instances of commendable or lacking performances resulting from certain practices. These recounts tend to converge on certain practices as their number increases and are subjected to "Expert judgement" described as having "traditionally been the principal mechanism for identifying the professional behavior"

"Health care needs": a factor that is fundamental and of capital importance that it tends to alter the very definition of competence as it links the medical education and training to the main intervening factor with professional health practice: reality and context. This tool resorts to "Public health statistics", Medical records" and "social, economic and political realities".

Another fundamental idea is also tackled which is the concept of mastery and "Mastery Learning" which lays the ground for debate on the process through which students will achieve mastery of a competence. It can be said that in contemporary debates, this process is subject to most divergence between models and the effect of this divergence reaches by extension our very own work and discussion.

The 1978 paper states three variables of "Programme organization" in "Mastery learning":

"Time" in reference to the hourly volume allocated to disciplines in medical education, found to be a variable with little effects or significance when it comes to mastery learning, a position shared by numerous works on CBME as the very approach tends to detach from pre-defined timeframes for the process of education and focuses more, to conform with the terminology of McGaghie, on whether the mastery is learned.

" Sequence" in reference to the arrangement and progression of subjects in an order often set by faculty, where basic subjects almost always precede clinical subjects, found to be a variable of relevance, if it results in expanding the pool of competencies (mainly clinical) via an integrated curriculum of studies that couples clinical subjects with their respective basic pre-clinical subjects as it limits the withering of studied information and promotes clinical reasoning.

" Mastery" references attaining the desired level of competence as an objective, which is a reaffirmation of the contrast between the traditional process-based education and CBME, where the goal of the education process is not finishing a course which students leave with varying degrees of proficiency in the subject, the end result is an agreeable level of competence that is pre-defined and the student is not limited by the course boundaries whether it's time or sequence to seek and reach his full development.

"Mastery" is assigned several components essential in its design:

"Specification of learning objectives "

"Identification of curriculum clusters": identified as related pieces which may be drawn from several biomedical disciplines.

"Development of instructional units": which is a drafting of objectives of units within the frame of the larger learning objectives: which later evolved into sub-competencies

"Encouragement of self-pacing": which is basically allowing the student to set the pace for their learning process which is a relatively uncomfortable change to accept or materialize.

"Recognition of competency levels": which stands for determining levels of competency, a concept found later in the models of ACGME designed in line with the five levels or "stages" suggested by Chambers and glassman (50) in the 90's: novice, beginner, competent, proficient, expert.

"Frequent assessment of learning": which stressed the importance of frequent evaluation of learning while suggesting a model that extracts evaluation from the raw examination of academic achievement.

McGaghie et al. (19) developed the point of assessment even further not only as a component of competency but as it's very own debate, a trend that will be picked up in much of the works regarding CBME throughout the 1980s and the 1990sThe ensuing shifting of the paradigm of assessment made the WHO propose models such as formative assessment and summative assessment but we do believe that in our context, debates regarding assessment would preferably take a back seat in favor of implementation while in no way diminishing its importance in the vitality of development of the educational process.

The 1978's paper concludes with discussing the institutional, student and teacher preparation process and the need to implement several changes to accommodate the structure of CBME.

These changes are arguably, even now, more than 40 years later, the main obstacle that hinders implementation of competency models especially at the phase of a neo-adoption of the paradigm, as the traditional construct of education is so deeply rooted at an institutional level, it no longer engages only the teacher-learner interaction, but extends to legislations, administrative procedures, institutional resource re-allocation and in post-graduate context, several changes as far as the progression of residents through their residency as well as departmental structures and responsibilities.

McGhaghie et al. (19) offer three strategies for curriculum change found to be adequate:

"Power": which is basically an executive implementation of a CBME program on an institutional level through an executive institutional figure or a group of figures constituting a board in charge of decision-making.

"Rationality": which is basically capitalizing on the rational appeal of the competency approach to scholars who usually make up most of the scientific and pedagogy boards of faculties.

"Re-education": which is basically an effort preceding implementation, with a goal of changing the rationale patterns to pry it away from traditional constructs.

While these strategies are drafted with different direct consequences, they converge on launching the concept of CBME into a form of implementation. It can even be said that they are essentially primary set ups of the framework of implementation. And perhaps the best way for these strategies to come to fruition is not to implement them separately but for the framework to consist of a cohort that joins these tools in one, while adequately determining the effective proportion of each tool and the way to sequence them properly towards total or even partial implementation.

Up until the WHO publication, many works have already explored sections of CBME in specialties and general practice, but what makes it an inflection point, is the fact that it globalized CBME.

It is no longer a local effort tool that has to admit a specific definition tailored to fit an American or north American context.

In fact, it is clearly stated that the most adequate way to define competency is through a set of desirable traits that range from clinical care to communication, to behavior patterns, to improvement of public health and all of these are highly influenced by the local social, cultural and economic factors.

These distinctions on the definition on competence and "what it means to be competent?", is very reminiscent of the modern six core competencies of ACGME, and the CanMEDs core competencies by the Royal College of Physicians and Surgeons of Canada.

Thus, it is no surprise that the ACGME: Accreditation Council for Graduate Medical Education was founded a mere 3 years later in 1981 following, "a consensus within the American medical community that an independent accrediting organization for graduate medical education programs was needed", that covered the entirety of the profession according to ACCREDITATION COUNCIL FOR GRADUATE MEDICAL EDUCATION FACT SHEET (20).

It was also one of the grounds on which the Royal College of Physicians and Surgeons of Canada endorsed the "Educating Future Physicians for Ontario project" to "to develop a competency framework for specialist physicians" (21) in the early 1990s, which transpired eventually into what we now know as CanMEDS competencies.

The Canadian and American approaches were among the seen results that showed the competency debate rather shifted, consensus is no longer about globalizing a definition of CBME and competence or competency, the consensus is that the rationale of CBME has then been legitimized as the complementary or substitute of the curriculum models that existed and embracing it was the most real and optimal way to drive quality further by driving education further.

Thus, in the 2 decades following the WHO endorsement, the competency debate transitioned into designing consistent curriculums as well the assessment of competency acquisition. Several examples include:

"Techniques of Identifying Competencies Needed of Doctors" by William R DUNN and Ronald M HARDEN in 1985, an effort by educators in the universities of Dundee and Glascow in Scotland, revisiting competency in relationship to accountability and strategies seen in McGghie's 1978 work as well as an early exploitation of the Delphi method in this context. (22)

"Competency-based Education in Family Practice" by the Society of Teachers of Family Medicine Task Force on Competency-based Education in 1997 describing the work of workshops in 1990 designing a perception of family medicine specific competencies, as well as an evaluation strategy through Formative assessment. (23)

The launch of Tomorrow's doctors in the United Kingdom by the General Medical Council in 1993, emphasizing a change in guidance from knowledge acquisition to a learning process that leads to outcomes multi-layered beyond clinical care. (24)

Another example, mentioned by Carraccio et al. 2002 (11), is the adoption of Brown university medical school of CBME through the MD2000 project in 1996, a rare early example of a full -materialization of an institutional curriculum according to the new paradigm.

There are also several accounts of measurable improvement after competency-based modifications of the learning process such as:

Dunnington et al. 1994 (25): investigating a competency-based clinical skills assessment program for surgical clerks using specific checklists and rating forms aimed at skills, which demonstrated improvement in skills across the academic year non-matched by traditional subjective rating forms.

Martin M et al. 1998 (26): Showing how a Competency-based instruction in critical invasive skills improves both resident performance and patient safety.

Stillman PL, Wang Y et al. 1997 (27): where three Chinese medical schools, in a year after implementation, found students in the new program significantly outperformed their colleagues.

Al-Chalabi TS et al. 1983 (28): which underscores the need to redefine educational objectives specifically, with aim of developing competences at a defined level for rotating resident doctors in Iraq.

As the scene was bustling on the institutional and local levels, there were a few significant events on an international front, one being the Edinburgh Declaration in 1988 after

the World conference on medical education held in Edinburgh in the same year, which according to the Lancet "began a global effort to make medical education relevant to all the health needs of the world's peoples", in reference to the decision of financing reform in curriculums in several countries after enunciating the evident links between medical education and the change of social needs. (30)

Another is the WHO'S 1991 publication entitled " CHANGING MEDICAL EDUCATION -An Agenda For Action" which re-iterates the pressing need for educational reform, suggesting strategies that can help overturn the complications of the endeavor of changing education especially in the frame of a fragile or poor health infrastructure like "optimizing human resources for health" and " search for national consensus", two strategies particularly relevant with the essence of our work. (31)

4. The Turn of the New Millennium: Birth of Core Competencies and Roles and the Outcomes-based Projects and Frameworks:

However, the next most significant points in the history of CBME wasn't until the turn of the new millennium: The ACGME, the council put in charge of accrediting medical education programs, agreed and introduced in 1999 the six core competencies that we know today, describing them in their 1999 annual report as the "six General Competencies that it thinks all physicians should demonstrate", followed by the Outcomes Project announced in 2001, which delineated the development of frameworks that took the six core competencies away from the general description and matched them with specific desired outcomes of the education process, this project resulted, in 2013, in the introduction of the notion of the MILESTONES and the subsequent implementation of the "Next Accreditation System" for accrediting specialties and sub-specialties, compelling them to produce their own milestones of training under the banner of the ACGME, which is effectively a direct link between CBME and actual accreditation, an event that signs perfectly the shift in the medical education paradigm.

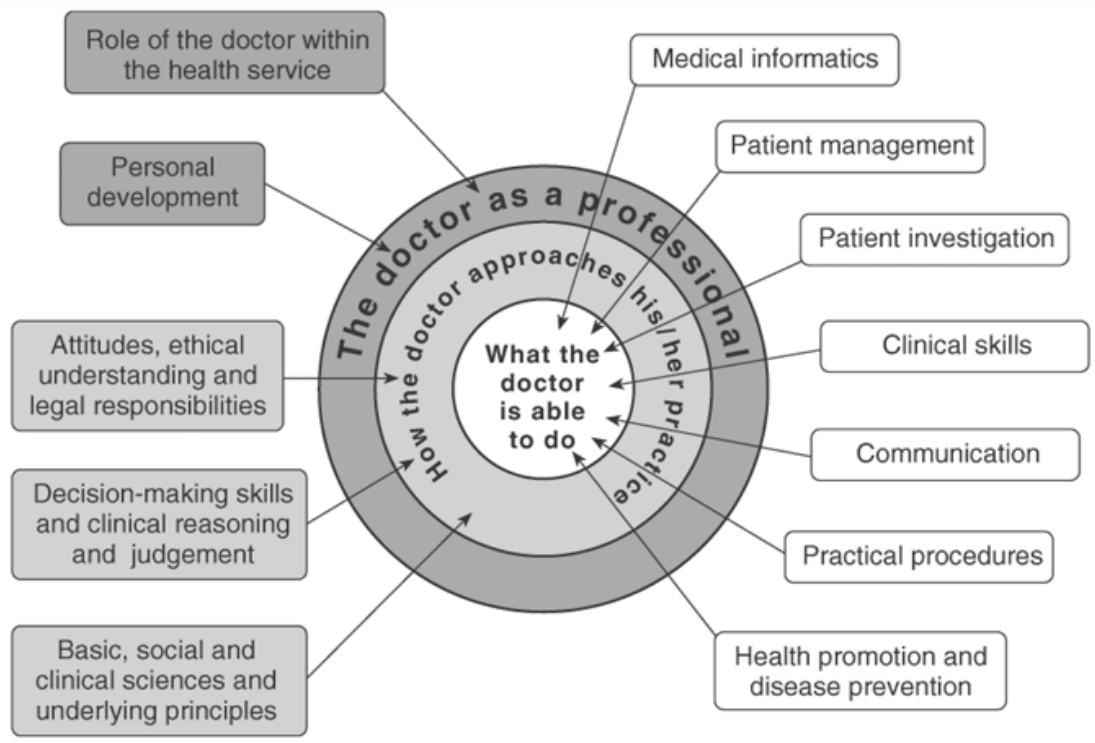
A similar announcement took place in Canada preceding the ACGME, where in 1996, the Royal College of Physicians and Surgeons of Canada unveiled CanMEDS, a result of the" Canadian Medical Education Directions for Specialists" or the "Can.M.E.D.S. 2000 Project" to the "Societal Needs Working Group" initiated all the way back in 1993 (32). Delineating "A Framework of Essential Competencies for Canadian Specialist Physicians", which is a listing of the 7 roles mirroring the six core competencies, that a specialist must be able to ensure. Implementation started at the level of post-graduate education or residency where each specialty was engaged in a five-year process to rework the CanMEDS standards specifically for that specialty or subspecialty, and by 2005, said framework was updated and adopted on a large scale.

However, the CanMEDS milestones that interest our work, are in fact a revision of the framework in 2015 that further developed the inventory of roles, updated the methods of assessments and introduced the notion of the EPA : "Entrustable Professional Activity" defined as " A key task of a discipline that can be entrusted to an individual who possesses the appropriate level of competence".(33)

The Canadian and American implementations of accreditation projects demonstrating palpable models subject to their national consensus significantly renewed international interest in developing CBME models.

Several countries embarked there-after on their own endeavors:

"The Scottish doctor—learning outcomes for the medical undergraduate in Scotland: a foundation for competent and reflective practitioners" (Simpson et al. 2002) (34): "undertaken by the Scottish Deans' Medical Curriculum Group (SDMCG)", their model consists of three 3 principal components or domains of competence with each being developed into objectives or "learning outcomes" totaling twelve, and while the circular modeling might imply one component is more central than the other, Simpson et al. 2002 insist that "the order in which the domains are presented is not intended to imply any hierarchy of importance."



The Scottish model is particularly worthy of mention not only because it is particularly detailed for its time, but because it also provides a different perspective or description than Americans or Canadians which despite the palpable contrasts in their approach, do nonetheless admit the same affinities.

Another is the "Framework for Undergraduate Medical Education in the Netherlands" Van Herwaarden et al. 2009 (35), after commissioning a "Project Group": a structure similar to a task force, in 2007 by the board the Assembly of Deans of Medical Schools of the Dutch Federation of University Medical Centers, in an effort to revise a blueprint of reform produced in 2001. The Dutch framework is heavily influenced by the CanMEDS roles to which they refer as competency domains, but what makes this example interesting for us is that it is among the few models that take into consideration bachelor's and master's degree programs in the bigger context of university , an experience that is particularly useful for a Moroccan endeavor to implement CBME in the frame of the switch to "License – Master– Doctorate" or "LMD" that most of the higher education follow in Morocco.

A final example is the Swiss PROFILES, acronym for the "Principal Relevant Objectives and a Framework for Integrative Learning and Education in Switzerland" revised and launched by 2008 (36). Motivated by the same developments in societal health needs as the previously mentioned models, the "Joint Commission of the Swiss Medical Schools (SMIFK/CIMS)" decided in 2000 to establish a "Swiss Catalogue of Learning Objectives for Undergraduate Medical Training" (SCLO), which itself heavily influenced by Dutch blueprints of the time. The same trend persisted in the ensuing PROFILES which naturally means that it is by extension based on CanMEDS roles and even incorporates the concept of the EPA in describing outcomes they believe physicians should be able to display (37). This example is particularly relevant as it demonstrates two ideas, the first is that it is perfectly acceptable to view implementing an educational reform both conceptualized and materialized in another country not as this foreign imported idea that the adoption of which demean educational sovereignty, as long as the model fits and can be a bridge towards improvement.

The second point is that the swiss model is basically a result of the reviewing of Canadian and Dutch models; it is standard practice for educational reform ideas or frameworks to appropriate parts of more of previous works as well as be a hybrid result of reviewing existing literature and distinct contextual data.

5. An Appraisal of the presence of CBME in the Moroccan Context

Speaking of contextual data, an appraisal of the paradigm adopted in the medical education in Morocco is a must, particularly in relevance to CBME.. Medical education in Morocco, in its Flexnerian sense dates back to 1962 marked by the founding of the first medical faculty in the country in the capital city of Rabat as a department of the University MOHAMED V of RABAT ("جامعة محمد الخامس بالرباط – Amazigh: ⵜⴰⵙⴷⴰⵡⵜ ⵎⵓⵃⴰⵎⴻⴷ ⵅⴰⵎⵙ ⵏ ⵕⵕⴱⴰⵟ"). Curriculums since then can be described as majorly process-based, and tend borrow heavily from French curriculums, a direct result of several years of French protectorate on the country. And although this influence is waning significantly as the French tend to fall behind on innovation when it

comes to pedagogy and education, its presence is still significantly palpable as French is for example still the language of studies despite the fact that it's neither the official language in the country nor the language used by the majority of the scientific community across the globe which is English.

Medical education in Morocco consists of academic lectures, hospital rotations, and assessment via examinations in their mostly traditional sense and has been nationally standardized after a minor reform done in 2015 that saw the introduction of subjects that weren't previously part of the curriculum. Some of these are actually a breath of fresh air as they seem to be closer to being student centered such as medical terminology, learning methodology, social Psychology and communication techniques. Some courses, taught to freshmen students in our very own faculty, do discuss education models and even feature the contrast between vertical and horizontal teacher-learner interactions that evokes the comparison featured above by Carraccio et al. 2002 (11).

In fact, our faculty tends to pioneer in the field of educational reform. In the frame of CBME, we saw a commitment by our faculty to introduce competency dictionaries by initiating the directors of specialty in the competency through seminars as well as introducing committees within the college of specialty to study and design the implementation of CBME, as seen in the report of accreditation project overseen by the faculty Dean Professor Bousakraoui in 2018 (38).

However, as far as entertaining CBME as a general reform goal, or discussing CBME on a national level, has yet to develop an audience when it comes to scholars, professors, educators, administrators, legislators and even student and residents.

On the inter-departmental level, several departments in university hospitals took it upon themselves to provide students during rotations with lists of objectives that tend to take on the forms of tables, with the objectives mostly revolving around medical care skills and curriculum related knowledge transcribed into practice.

However, the existence of these objectives outside the frame of competency-based education is often obsolete because simply: what good is knowing the objective, in the absence of a sense of prompting to achieve it properly? Be that through a personal desire for improvement and skill acquisition, or a departmental approach that moves beyond the archaic vertical communication model that makes objectives feel more of burden or a chore than a commitment or responsibility.

A significant endeavor in the Moroccan context of competency-based education by the department of Endocrinology in MOHAMED VI University Hospital in Marrakech headed by Professor EL ANSARI, to develop and implement a competency-based curriculum for the rotation of fifth year medical students in the department. The experience was described by Soussi Salma 2020 in a thesis intitled "Implémentation d'un programme d'Approche par Compétences en stage d'externat au service d'Endocrinologie- CHU Mohammed VI de Marrakech". (39)

It outlines a Moroccan interaction with the Canadian EPAs in order to improve the learning experience, where 5 broad EPAs were developed, and mapped to Endocrinology specific undergraduate objectives, resulting in 19 department-focused EPAs, and an operational model framing the rotation of medical students demonstrating the feasibility of the adoption of the CBME despite limited departmental resources.

It also served to introduce another structure known as the Clinical Competency Committee which is particularly relevant in several implementations of CBME, one that is also emphasized in ACGME guidebooks as an essential component of the evaluation process of competency acquisition, public accountability of curriculum outcomes and the eventual modifications and improvements after the first implementation of competency based curriculum.

Speaking of which, reviewing this experience should analyze thoroughly the set of issues and setbacks arising from operating this curriculum as practical implications of implementations of a new educational model is bound to reveal some shortcomings and problems that might not be foreseen in theoretical conception, several of these setbacks will keep reoccurring

consistently in further models due to similarities in development deficiencies or similarities in department structures and resources limitations such as human resource deficiency, or resistance to a specific EPA concept. Allowing reoccurring problems to continue plaguing the implementation of CBME will severely tax any prospect of improvement of pre-established models.

Another relevant citation, regarding the concept of competence and efficiency in the Moroccan experience, is a thesis on " Students' Perception of Clinical Self-Efficacy In Family Medicine Core Competencies described by Moniba Korch in 2022 (40), this study employed a survey that was modeled to cover as best perceived, several competencies based on the six ACGME core competencies. A decision that came in light of the lack of Moroccan guidelines and consensus on the core skills medical students should acquire during their studies. Which happens to be an even starker affirmation of the necessity of a framework employed as a launching pad towards more intricate educational concepts such as outcome-based evaluation.

The survey contained a sum of 40-items divided into clinical and non-clinical competencies reviewed by a panel of 7 professors that reveals what could be the first ever attempt at drafting a Moroccan model for milestones, drafting 38 competency elements readapted as such:

Patient care and procedural skills: 1) Generate an initial diagnosis for acute presentations 3) Develop differential diagnoses for acute presentations 4) Formulate a management plan for an unstable patient with an acute presentation: 1. Chest pain 2. Dyspnea 3. Loss of consciousness 4. Acute sensory or motor deficit 5. Abdominal pain 6. Acute fever 7. State of chock 8. Oligo-anuria 9. Trauma 6) Formulate a basic management plan for chronic illnesses: 1. Hypertension 2. Chronic heart failure 3. Diabetes 4. Dysthyroidia 5. Asthma and Chronic Obstructive Pulmonary Disease (COPD) 6. Tuberculosis 7. Chronic Viral hepatitis 8. Epilepsy 9. Cancers 10. Mental diseases 7)Performing family physician procedures independently: 1. Paracentesis 2. Arthrocentesis 3. Chest drain for pneumothorax/pleural effusion 4. Urinary catheter insertion 5. Nasogastric tube insertion 6. Intravenous peripheral catheter insertion 7. Simple sutures 8. Chest compressions	14) Conducting therapeutic education for your patients (dietary habits, smoking, physical activity) 15) Identify opportunities to maintain and promote wellness **Medical Knowledge:** 2) Incorporate key elements of a patient story to form a diagnosis 5) Describe the pathophysiology of common Diseases 8) Interpreting results of common diagnostic tests 22) Knowledge of the basics of research methodology 23) Critical reading of an article **Systems-based practice:** 12) Adapting your management plan to the patients' social and economic status 16) Knowledge of patient safety principles 17)Coordinating care effectively for patients needing a multidisciplinary approach 18)Demonstrating safe and effective transitions of care and hand-offs 32) Knowledge of health-payment systems and types of insurances 33) Identifying basic knowledge domains for an effective transition to private practice	**Professionalism:** 26) Knowledge of ethical principles 28) Ability to stay professional under all circumstances 29) Prioritizing your personal and professional well-being 30) Confidence you'll be supported by your seniors when you're in a bad physical or mental state hindering your learning 31) Asking for help from a senior when you're at your limit in your knowledge and skills **Interpersonal and communication skills:** 13) Adapting your language and non-verbal behavior to your patients 19) Requesting and receiving a consultation appropriately (SBAR or another systematic method) 20) Using language that values all members of the health care system 24) Establishing a good patient-doctor rapport 25) Delivering bad news to a patient or his family 27) Protecting patients' private information

This was a very commendable effort and is a much needed first step that can ease our consideration of milestones, especially since it involves an experience of self-evaluation for students and for many a first interaction with the concept of milestones.

The study exposes several areas of limitations in students' comprehension of the concept milestones and the core competencies' spectrum that the drafting of the questionnaires needed to resort to technical specifications especially in patient-care competencies.

This was done to avoid descriptions of competencies judged too broad and resulting easily in confusion, or "over-generalization", which is rather understandable since the miscomprehension has deeper roots in the miscomprehension of the goals intended in core-competencies themselves.

Core-competencies are not a textbook, and the goal behind them is not an on the spot assessment of the academic grown capacities as the structures to guide and evaluate those are already quite numerous.

Core-competencies should be thought of more as the scaffolding for outcome-based education, in which a practitioner in the Moroccan health system is provided with a profile of competencies that are desirable and can outline measurable efficiency in practice. Thus, the need for an even larger consensus on this profile.

Referring to the drafted competencies as a profile and not as milestones was deliberate as it brings out a point of discordance with our approach of the concept of milestones, while it is tightly bonded with the ACGME milestones, we tend to stress heavily the use of it as the project management tool aforementioned.

What Korch's thesis describes as milestones, we view in our framework to be more an end-result evaluation of competencies as it does not guide nor evaluate improvement through a measurable or trackable pattern of evolution of the project of training.

However, it found to be more in line with the second tool of our framework which the competency dictionary, the aforementioned resource-management tool that is drafted mainly to evaluate practitioners past their training years.

All the points outlined above coupled with the deficiencies found in the completed evaluation and the constant deserted local study field on the matter are a testament of the vital need for a framework that lays the ground work to define components of competency that is subject to consensus.

And while it is, as stated, common practice to adopt already developed models of competency components such as the ACGME model or CanMEDS, we find it to be rather trivial in current circumstances to do so without an extensive effort of laying groundwork for CBME first and most importantly draft a context-appropriate framework that would result in development. This is essential as the mere factual variations of our epidemiological data entails a variation of the needs of the country and its expectations of its health system and by extension its medical education.

Which is the recurring main motivation we keep encountering at all the inflection points of our tracking of the evolution of CBME.

6. The Historical Continuum's Input in our Approach:

Our detailed description of the timeline of Competency-based education wasn't mere padding. It is done with two main purposes:

First, to track the pattern of evolution of CBME in countries that undertook early development, in an effort to highlight the point of natural resistance and difficulties that are faced when upsetting the stability of the system with a structural or fundamental change. It is bad enough that health education seems to always be subject to obstacles of different natures (Maryam Fourtassi et al.2020) (41), we are not certain that reforms can support the extra weight of negative bias.

Further examining examples of CBME projects that actually persevered, might give us valuable insight on how they went beyond their own negative bias as well as reaffirm the fact the continuing need of educational needs seemed to drive all of them eventually towards CBME.

Second, tracking the pattern evolution helped us built a continuum of development, on which we can now locate our exact position on that continuum and in the competency debate. Hence, we do estimate being in the vicinity of the 1978 WHO report as far as the competency debate. Therefore, it is only fitting that the process of drafting benefits from the guidelines of that report.

II. Establishing Operational Definitions of Competency and Proficiency:

1. The evolutive Debate on Competency Definition parallel to the Historical Continuum of CBME:

As apparent in the pattern followed by CBME or the competency debate throughout its most recent history. Embarking on endeavors to develop competency models or approaches, whether general or specialty specific, often entails engaging in a conversation on defining our intentions of terms such as competency, competency based medical education and in our case proficiency.

Each inflection point in the history of the competency debate left dents in the definition of competency, starting with the 1978 WHO publication (19) who stated that a universal consensus on defining competence and competency is an effort that "will inevitably fail". Citing the direct bond between defining competency and the local political, social, economic and health needs as well as the structure of the health care system and resources.

This was view however regressed, as the conceptual separation between competence as a definition and the elements of competence as a construct started to emerge.

The ideation and adoption of the concept of framework of competency-improvement, took the definition effort of a competency from a rather philosophical or principle debate, to an operational dimension. Competency is now the sum of the elements and traits that confer to a practitioner the epithet of competent. This is why in more modern frameworks like the ACGME, their answer to the question, "what does it mean to be competent?" is a display of adhering to a profile composed of the core competencies of medical practice.

In fact, earlier debates on competency definition, often did deal with the competency construct as an array of clinical situations with unsatisfactory and satisfactory outcomes and using the critical incident techniques designing what is described as ineffective and effective procedures. Evidently, such an approach covered mostly clinical care abilities which constitutes only a section or a facet of the competency construct.

The "operational" definition in the American framework dates back to the work of Carraccio et al. 2002(11) preceding the establishment of milestones, where they define competency "as a complex set of behaviors built on the components of knowledge, skills, attitudes" which was in line with the most commonly used terms associated with competency in educational settings of the period.

Speaking of which a very significant publication, contemporaneous to Carraccio by Epstein and Hundert 2002 (42) sought to establish a large multi-dimensional view of competence in a professional sense, through a very extensive review literature on the subject.

This work synthesizes a definition of professional competence as "habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served."

It is out of such definitions that professional settings as well as human resources management research moved towards adopting Competency Dictionaries that group together several practical and field specific descriptions that reflect this multi-dimensional range of

competence, while educational boards and licensing boards started developing more and more tools that outline developmental patterns the multi-dimensional aspects of competence.

This is reflected in modeling the Milestones by the ACGME and the EPAs by the Canadian Royal College around the set of core competencies, if parallels are to be drawn, where the Epstein-Hubert dimensions of competence for example include "Cognitive and Technical dimensions", the ACGME speaks of Patient Care and Medical Knowledge and the Royal College of Canada speaks of the competency of Medical Expert.

It is also around this time that some distinctions in definition were made between Competency and competence and the significance to the denomination of the new approach of education, as competency -based or competence-based.

The definition debate, despite generally taking a back seat to framework designs, did evolve, along with the evolution of the designing of frameworks. And the description of competence always needed to demonstrate besides its multi-dimensions, a lofty, vague and far-reaching range that accommodates the variables that come with diverging framework designs, while a competency took more and more on the description of abilities or capabilities and are the organizing units of CBME (Albanese et al. 2008) (43).

The most relevant definition to our approach however, is the Proposed definitions of CBME and related terms by the International CBME Collaborators outlined by Frank et al 2010 (2) as such:

Competence
The array of abilities across multiple domains or aspects of physician performance in a certain context. Statements about competence require descriptive qualifiers to define the relevant abilities, context, and stage of training. Competence is multi-dimensional and dynamic. It changes with time, experience, and setting.

Competency
An observable ability of a health professional, integrating multiple components such as knowledge, skills, values, and attitudes. Since competencies are observable, they can be measured and assessed to ensure their acquisition. Competencies can be assembled like building blocks to facilitate progressive development.

Competency-based medical education
An outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies.

Competent
Possessing the required abilities in all domains in a certain context at a defined stage of medical education or practice.

Dyscompetence
Possessing relatively less ability in one or more domains of physician competence in a certain context and at a defined stage of medical education or practice.

Incompetent
Lacking the required abilities in all domains in a certain context at a defined stage of medical education or practice.

Progression of competence
For each aspect or domain of competence, the spectrum of ability from novice to mastery. The goal of medical education is to facilitate the development of a physician to the level of ability required for optimal practice in each domain. At any given point in time, and in a given context, an individual physician will reflect greater or lesser ability in each domain.

These definitions were found to be a relevant and adequate starting point of our definition of competence as they were drafted to be in line with the structure of the Entrustable Professional Activity: it is broad and over-reaching, it is specific to a practical context, it is meant to incite judicious and dynamic credentialing of the training doctor and generally to frame performing the professional activities expected of a good doctor within a given specialty.

2. Our Operational Definition of Competency and Proficiency:

If we were to have our own definition, it would be that Competency: is a measurable set of complementary and harmonious acquisitions, each stemming from a specific facet of the medical profession, each admitting a known path of progression leading up to a desired level of mastery and combining all of them constitutes a profile forecasting an autonomous proficiency in medical practice.

This autonomous Proficiency is the proficiency our framework tries to outline through its dual process.

It is therefore necessary to define the term in the context of our framework.

Cambridge university press & assessment's Cambridge Dictionary defines "Proficiency" as "the fact of having the skill and experience for doing something".

The operational definition of the term isn't too far off its proper linguistic one.

While the competency is the sum or set of acquisitions, that can be described as the standards to meet, proficiency refers to a rather comfortable mastery of those acquisitions.

The introduction of proficiency into the education models was mainly in the Dreyfus & Dreyfus, 1986 publication (44) outlining the five stages of skill acquisition, based on which several education models still rely. Proficiency or the skill level of proficient is the fourth level out of five, just below the Expert and most importantly just above the Competent.

This is because being proficient implies a certain amount of mastery fused with an intuitive bias built on constant analysis: of the various situations of practice, the decision process implemented in those situations and the outcomes of that decision-making process.

This is the reason why it's considered a comfortable mastery of a competency, as that level of mastery allows enough space for a practitioner to apply analysis to a situation and allow that situation to guide the response.

Proficiency is even described as "A Transitional Stage on the way to Expertise" (Benner, 2004) (45) as the only difference is the degree of fluidity of the thought process of the expert, being sharper and more efficient thanks to the acquisition of more practical wisdom the attainment of which demands a significant amount of practice and time.

This is why our framework, alongside many others, outlines proficiency and not expertise, as proficiency in a certain competency is significantly and realistically more attainable as a goal of the time-limited training process.

III. Establishing the Dual Process Structure of the Framework:

1. Competency Components according to the WHO guideline and the process of adopting the Competency Dictionary:

Establishing our definition of competency, proficiency and their inter-changeable values, prompted reflection on components of competency in our context.

Reflection on these components went through a thought process that eventually concurred with a cognitive theory known as dual process theory, a process where the human mind ends up with a thought or a concept resulting from two different pathways of cognition.

The dual process structure for our framework was the natural result of a stratification of layers upon layers of consideration of the various elements that guide the choice of competency components.

The first layer of consideration was determined by our position on the continuum of the competency debate which is the 1978 WHO publication (19), which states in its description of the "learning for mastery programme": that the first step in drafting any program is the "specification of objectives" resulting from the same process of specifying competency components.

And specifying competency components requires two vital phases: first, defining the form or mechanism that the mastery learning program will be shaped after. Second, determining the measurable elements that structure will hopefully guide or assess.

To help reach consensus on an appropriate structure, McGaghie et al. 1978 (19) described factors as the source of objectives and the mechanisms for establishing priorities:

These are: "Analysis of physician's activities", "Critical elements of behavior" and "Health care needs".

Exploiting these tools, imposed sorting them first in an order of relevance to structure choice:

Healthcare needs was the first element of consideration because it is perhaps the most telling parameter on which structure should be used to guide or track competency and thus decide the nature of the framework to put in place, as implied in the Adjou Moumouni unpublished manuscript on the needs of competence in Africa.

Healthcare needs are judged through Public health statistics, Medical records and Social, economic, and political realities. However, these have an extremely large range, much of which is irrelevant to our work and reviewing public health data must also be done through the lens of relevancy to education and development. The acquired data shows:

A report published in 2009 by the ministry of health outlining strategic goals in demographics of healthcare workers by 2025: insists that investing in the future of human resources i.e. doctors and nurses begins with according more attention to training and recruiting doctors as well recommending the creation of a learning environment that is favorable in term of training, field supervision and continual training and development.

Another report published in 2012 (46) outlining the governmental strategy for the health sector between the 2012 and 2016, defines among the actions to be taken in the development of the strategic resources of the ministry of health, the modernization of human resource management through the creation of the "Référentiel des Emplois Compétences " or the Competency Dictionary which is a repository of referenced competencies in line with the directives of the ministry of public administration, which renewed its pledge to the referential idea through publishing a methodology of development as well as a guide of speculative management in 2016.

The idea of this competency dictionary finds origins in the 1990s and is present in the directives of the French government regarding mainly human resources management.

Uses in guiding university education, was explored in the work of POSTIAUX et al. 2010 (47): in which much of the coveted objectives are found to be attainable through this structuresuch as quality evaluation, program reform, learning evaluation, a frame for a collective vision of competence all in a method that can be materialized and activated then evaluated.

In the more specific context of medical education, a work of C. ATTAIL et al. 2006 (48) was found relevant as it addresses guidelines for referenced qualification procedure in a professional capacity for a medical doctor. Viewing competence in a sense of professional capacity learned through a training program increases proximity with current Critical Care and Anesthesiology training, where they underline notions that can be grouped in an inclusive profile of competencies such as procedural capacities, auto-critic, practice valuation and the ubiquitous commitment to lifelong learning in every source that discusses competency in the context of reference qualification.

Another relevant piece of data, is the 2021 report of the ministry of health (49) that shows a total of 466 Critical Care and Anesthesiology doctors operating in the public sector of the Moroccan health system, with an undisclosed number operating in the private sector. Which can be described as a state of penury in the sector, and since 2009, the planning of ministry of health speaks of partnership between private and public sectors in most fields of practice as a necessity for any meaningful compensation.

Therefore, a framework of competency modeled as a Competency dictionary is ever more evident: in the context of this penury, the health system and the population need cannot handle fluctuation in the quality of care provided by practitioners, it is upon all the intervening parties to make sure that the doctors, few as they are, conform to a higher standard of quality and qualification as to not drive the wedge of penury even further. And since the private sector is seen as a vital partner in combating the state of penury, it is only adequate that the model adopted to review competency provides guidance for that sector as well.

In the light of the nature of interaction between private and public sector and poor records keeping, measurable assessment of competency in the private sector is certainly challenging and therefore our best bet would be a frame that details a complete profile of qualifications that would, at the very least communicate the level of required qualification for proficient practice.

All the data above, are coupled with arguably the most significant Moroccan institutional recommendation in this regard: the revival of the competency commitment and interest in competency-based improvement projects by the Moroccan Society of Anesthesia, Analgesia and Critical Care ("Société Marocaine d'Anesthésie, d'Analgésie et de Réanimation "): SMAAR, who re-launched in 2015 calls to develop the Competency Dictionary in the specialty and who's efforts have been vital to the viability of our approach and the development of an operational framework but most importantly reaching the most coveted characteristic of any referential which is as we consistently emphasize: attainment of consensus, the process and outcome of which were earlier described as well as outlined further on.

The sum of these elements creates initially an intuitive leaning in our decision-making process towards a competency dictionary structure in our approach. Reinforced by the local endorsement of the competency dictionary tool by our faculty in the approach of competence.

2. The process of adopting the Milestones structure and the Birth of the Dual Process:

However, despite a Competency Dictionary's apparent pedagogic application, it is still mainly a human resource management tool. And while it shows the end profile it doesn't do much in lighting the path that leads there.

Our goal is to establish a structure that is a comprehensive guide of Critical Care and Anesthesiology training engineered to be as beneficial as possible to proficiency development. Subsequently, the range of the framework must cover installing the concept of proficiency and competency from the very beginning of training. This is particularly relevant since our health system admits currently a significant portion of its human resources as residents of the specialty in university hospitals across the kingdom.

These are doctors who haven't yet concluded the process-based education procedure but still take on several health service responsibilities. Thus, for the structure to be fully beneficial, the structure of guidance needs to stretch to cover training guidance.

This is admittedly in line with our affinity to educational development and reform in the context of faculty and with the directives of SMAAR, which led us to explore other structures within the paradigm of CBME in search for a complimentary tool that when affixed to the framework structure, remedies the deficiencies that we have mentioned.

This is the context in which the pre-existent frameworks by the ACGME and CanMEDS were described earlier on as being useful in rushing the steps.

Examining those frameworks piqued our interest in the practical deployment of the concept of the "Milestone" in our structure.

A milestone is originally conceived as a project management tool used to track the completion of important events or steps vital in accomplishing the entirety of the project. This is what prompted its designation by the ACGME guidebook as a "a significant point in development".

The training of a Critical Care and Anesthesiology resident can in fact be seen as a project that ends with the production of a functional Critical Care and Anesthesiology practitioner to integrate the health system.

A project management tool is adequate to guide the training of those residents by establishing a frame for measuring the residents' performance levels throughout his years of training, assess skills acquisition through pre-established indicators of proficiency culminating in a competency level consistent enough with the autonomy and profeciency of practice. Those competencies are evidently multi-faceted, and the sum of which, constitute an entire profile of an autonomous practitioner.

This notion of a profile of competencies resulting from a progression through phases, that can be referenced as the description of the sum of desired competencies is very evocative of the structure of the competency dictionary or the "référentiel de compétences" that we discussed.

How both tools coincide in goals, while one is seeming to be an outcome of the other, is very indicative of a palpable amount of synergy between the two. Combined in one structure for our framework, they can assume complementary roles in competency development, that covers the per-training and the post-training phases of practice. Other facets of complementarity are the fact that the competency dictionary model, is locally pre-defined and endorsed by the legislative and the administration in general practice, CBME and milestone programs are subject unfortunately to a deserted study field locally and therefore could benefit from being associated in the same framework of the Competency Dictionary as complementary in function and structure and subsequently in endorsement and legitimacy. It also serves us as our approach's focus is on Critical Care and Anesthesiology, the dual structure of the framework will definitely help circumvent the lack of general medicine milestones susceptible of weighing our framework down in its pursuit of local consensus and eventually local endorsement, making the entire competency approach adoption on a large scale way more accessible for SMAAR to implement.

Pursuing local expert consensus is always emphasized due its importance, not just by the apparent motivation to garner as much operational support as possible but also because it stems from the 1978 WHO publication on CBME we alluded to before, throughout which, consensus was found to be a vital component in tools aimed both at defining competency elements and implementation preparation.

For element defining, expert consensus in itself can translated into the tool of "Expert Judgement" under the banner of "critical behavior elements": which suggests that adequate descriptions of competency and proficiency "come chiefly from the teaching staff".

Preparation of implementation on the other hand urges consensus in another fashion: in the frame of implementations done through executive decisions requires "a group of department heads who negotiate with one another like leaders of sovereign states" as well as in implementation by rationalization and progressive re-education around the new model of training, one of the most detrimental barriers is discarding consensus where the seekers of change become " their own enemies" by being "zealots" and " demanding unswerving adherence

to a single view" which eventually will " arouse hostility and resistance instead of fostering the spirit of cooperation that is essential to successful implementation of a competency-based programme".

Continuing that trend of consensus is what drove us to examining Milestones through the lens of ACGME and canMEDS specifically. These frameworks have garnered support from a lot of other Critical Care and Anesthesiology bodies around the world, accounts of which we outlined in our tracking of the history of CBME. This indicates that these models do draw lines of consensus that were not exclusively local to their boards and accreditation council but transcend that context across borders. This was the main driving force in making them our starting frame of studies as we perceive that doing so would serve to increase the odds of our own framework accessing local consensus.

Subsequently the two strctures of the dual process admit twoforms of consensus, with the competency dictionary having local governmental endorsement and milestones being subject to several foreign experts' consensus inducing exploration of the prospect of this dual process that was consented by SMAAR's committee officiating specialty referential and CBME.

This consent was however conditioned by how well the end result tends to serve the objectives desired from such a framework by SMAAR, these objectives were mainly:

The guiding and maintaining of development of competency towards autonomy and proficiency for Critical Care and Anesthesiology doctors.

A drafting of the framework that enables an environment of potential for future improvement and refining through modifications of content and structure, permitting further thematic specifications. and further objectives in line with continual learning

And eventually an outlook on the essential element of assessment of competency as well as the evaluation of input this framework tends to provide to competency acquisition.

3. Developing the Milestones: Establishing a repository of Competency description through the review of the ACGME Framework:

Resolving to adopt this dual process structure along with having a set of objectives to meet, has allowed for the process to naturally transition into the building and assembling of the dual process framework, and since milestones tool was found to result in a profile of competencies confluent with the referential, we elected to start the building process with building our milestones.

Moroccan Critical Care and Anesthesiology milestones are defined in earlier section of this thesis emphasizing their complimentary project management role in the framework.

The development of these milestones went through as described in earlier sections, a rigorous reviewing of the ACGME and canMEDS models leading to their eventual deconstruction, rearrangement and selection coupled with an input of context that saw the agendas of some of these milestones change:

Our reviewing started with the ACGME's product Milestones for both anesthesiology and critical care, which were designed and implemented in two separate sets of milestones conforming with the fact that the two specialties go through separate training processes.

The 2016 milestones (7) as well as Milestones 2.0 (5,6) were described as "developmental frameworks": a narration of skills and traits desired in the practitioner described on a continuum timestamped with five levels conforming with the model described by Chambers and Glassman in 1997 (50) and the Dreyfus and Dreyfus expertise development model (44): where competence levels start with "novice" and progresses through "beginner", "competent", "proficient" and finally "expert". However, the levels in the milestones' worksheets, progress is assessed from level 1 to level 5 with the aforementioned terminology heavily implied.

Level 4 was designated as the "graduation goal" by the ACGME, with a particular nuance to be outlined here: it is a graduation goal not a graduation requirement, it leans heavily on the guidance side of objectives of the framework in the American context while providing a frame for an upgrade in assessment procedures, which is also evocative of the objectives we expect to accomplish by developing our own framework.

Speaking of objectives, our reviewing of the several American frameworks is an exhaustive collection framework components found to be useful in the drafting of our own framework. Therefore, we did not proceed with bias towards Milestones 2.0 since it is the revised version, nor did we confine ourselves to the skill progression described in one model of the American framework or the other.

In fact, our first comparison table comprised of all sub-competencies of Critical Care was not only meant to find similarities in content or progression but also in search for a sense of consensus, on any themes or progression patterns.

It was at this phase that we found that in the milestones 2.0 frameworks Critical Care milestones and Anesthesiology milestones have complete consensus on the milestones arising from four out of six of core competencies. These four being: Practice-Based Learning and Improvement, Systems-Based Practice, Professionalism, Interpersonal and Communication Skills which account for eleven milestones in both frameworks whose worksheets are exactly similar.

The other two were Medical Knowledge and Patient Care. As for Medical knowledge milestones, the titles may diverge but the content is mostly similar, revolving around pharmacology and physiopathology of illness, as well as a milestone in Anesthesiology emphasizing clinical reasoning in the sense of its application in patient care, particularly evaluation of patient and differential diagnosis.

Expectedly, Patient care milestones are the area where the Critical Care and Anesthesiology Milestones 2.0 diverge significantly due to the differing practical range and care focus between the two branches of the specialty, although we do find similarities around

competencies of crisis management and monitoring duly present and required in all aspects of practice in the specialty.

It is on these grounds that the mentioned decisions of omitting all but patient care sub-competencies from the anesthesiology milestones as well as basing the first table meant for collation on the Critical Care milestones from 2022 and 2016 that are inherently comparable. And since milestones from the other five core competencies are similar in the Milestones 2.0 frameworks, a comparison between the critical care 2016 and 2022 models amounts to a comparison with the anesthesiology model as well.

And as for Patient care milestones in anesthesiology, the 2020 worksheets were judged a sufficient source for the exhaustive collection of American competency components.

Exceptions were however made for "Application and Interpretation of Monitors ", "Situational Awareness and Crisis Management ", "Critical Care " that were adjoined with the 2022 critical care sub-competencies and then subjected to the comparison with the 2016 model as sub-competencies of Critical Care, due to their relevance to both branches of the specialty and their integration was coherent and did not hinder the comparison or seem out of place.

The comparison had two major outcomes: the first regarding the description of progression of the acquisitions of levels of competencies: done in the 2016 model through a re-iteration of the sub-competency's text or element of assessment affixed with the degree of supervision or independence. The terminology used as often one of the following phrases: "with direct supervision", "with indirect supervision", "with conditional independence" and "independently". Milestones2.0 revision however parts ways with this terminology and tends to describe the progression of the competency through introducing, in later levels, new elements of competency usually maneuvered by senior residents by underlining an aspect of the described sub-competency that requires a certain amount of seniority to be able to manage it proficiently.

While the latter option is admittedly more aesthetic and concise, it is noteworthy that it was a result of revision of an older model that was around long enough for users to understand and embrace the idea of progression through the competency stages, which cannot be said

about our context and therefore any model that will hope to reach a minimal operational comprehension had better outline the progress through competencies clearly and without confusion, a fact that will impose several choices in the drafting of our milestones further on.

The second outcome of the comparison is the more direct one which is the mentioned collection of competency descriptions. However, several choices were made in this process some of which have to be expanded:

A patient care milestone intitled "Management of Organ Dysfunction and Shock "solely present in the 2022 critical care model, was integrated in the larger specter of crisis management due to theme proximity and its inferred presence in the 2016 crisis management milestone.

A patient care milestone intitled "Palliative Medicine/End-of-Life Care" solely present in the 2016 critical care milestones, taken off the worksheets over probable specialty separation but found relevant in our context and therefore integrated in the inventory of competency descriptions.

A medical knowledge milestone intitled "Clinical Reasoning" solely present in the anesthesiology model, was found to be sufficiently emphasized in patient care milestones in 2016 and actually more suitable to the theme of patient evaluation.

Practice-based learning milestones across all models were found mostly compatible in themes and their respective sub-competencies were mutually enriching, apart from one milestone on the education of other team members present solely in 2016 model which was found particularly relevant to our context, not in the theme of practice-based learning, but more as a cohort of communication and system-based practice skills.

Several sub-competencies across system-based practice, professionalism and interpersonal communication milestones were also found to be mutually enriching and therefore, in absence of a direct bilateral comparison between each two milestones, said comparison moves to the larger specter of related themes and eventually to the inclusion of the sub-competency in the inventory if it raises a theme of competency non previously addressed.

The resulting inventory of American sub-competency descriptions was found adequate through the lens of relevancy and after the elimination of redundancies.

4. Developing the Milestones: Establishing a repository of Competency description through the review of the Canadian Framework:

Having secured the American repository, we moved to procuring more materials for our work by applying the same process to the EPAs implemented by the Royal College of Physicians and Surgeons of Canada and their canMEDS milestones.

Several points of emphasis must be made: The stages of training in contrast with the American model, are not time stamped milestones by level where sub-competencies are tracked trough a trajectory of acquisition, each EPA is more a profile structure in place and the evolution goes from a detached of practical work phase that is a predominantly hands-off learning to an exit level that consists of a passage to practice, several EPAs tend to appear in later stages while several others tend to be mentioned solely in earlier stages of training.

The EPA name, "entrustable professional activity", is described as "a statement about the work of the discipline". In our review, it is an inclusive summary, a short description of the purpose intended by the EPA.

Each EPA name is affixed with its main Key features and together they constitute a relevant point of comparison with its American counterpart, the counterpart being the competency or the title of the ACGME sub-competency. It also serves as a tool for the adopted rearrangement in our approach of the several EPAs and their respective canMEDS milestones according to the 4 families of skills to be further described.

Being a profile structure, the EPA consists of a sum of milestones and examining them through the lens of key features of the EPA reveals the details for the ensemble of acquisitions that constitute the EPA.

It also notable that, each canMEDS milestone is an extension of a canMEDS milestone existing in a large repository that interests general practice, which is a great way to stress the continuity of the aspect of competence and the interest of pursuing it early on in the training process.

Specialty specific milestones are the main objective of our reviewing of the Canadian approach and are the main materials along with EPA name and Key features used in our deconstruction of this approach.

The process establishing a repository of Canadian milestones that are specialty specific required the described rearrangement of the milestones and the rigorous use of the font, character colors and highlights that we employed. It enabled tracking the milestone in the new construct all the way to its original placement in the guide and to highlight the need to reexamine it through the lens of other EPAs, other base competencies, other models and the local context.

The EPA was as stated reported only once to its dominant canMEDS core competency. This was done according to three elements of decision making: the description of the EPA (name and key features), the evident countable numeral superiority of the presence of that canMEDS core competency related milestones in the EPA and eventually our contextual judgment and whether or not its inclusion is needed.

Bonding the EPA to only one, whenever possible, core competency was a necessary step to warrant the eventual elimination of redundancies in milestones and most importantly eliminate the distance between the Canadian EPA and the ACGME milestones, making the repositories of competency descriptions comparable.

This was done by the mentioned five color system of highlights pertaining to the four skill groups that we defined, the choice of the five color groups comes from the fact that the rearrangement imposed that the patient care skill tenets required a further in depth distinction between two of the corner stones of the patient care milestones and EPAs, between

competencies on one side relating to patient evaluation and crisis management and the other side the procedural abilities and technical skills.

Patient care skills are arguably the most important corner stone skills for Critical Care and Anesthesiology practice and are always subject to even more careful evaluation and reviewing.

This does not diminish the importance of the other skill families in any way. However, it is noteworthy, because it seems that patient care skills grant the framework more relevance and are the closest to understanding and assimilation among the concepts of milestones especially on first contact.

The elimination of redundancies in milestones was also done through the described selection process, and keeping their empty slots in the repository outlook was done not only to enable reconsideration but to prompt it consistently.

It is also very significant to bringing repositories of competencies to adjacent grounds by associating each canMEDS milestones with only one EPA and its Key features and only one stage of training to put operational limits on its range and facilitate comparison.

Such process might seem like a complete defacing of the Canadian model deemed necessary in search for adequate competency progression and also serves to indirectly emphasize that we review the various competency models in order to serve our objective of extracting milestones into a useful repository without baring any allegiance to the objectives of the ACGME or the royal Canadian college beyond the direct operational meaning of the collected descriptions.

This an important element to lay out, as redistributing milestones and competencies along the line of skills groups we see fit requires such level of liberty of detachment from the agendas of foreign accreditation boards operating in different contexts that don't necessarily match our expectations or objectives.

The resulting array is massive and the lion share of canMEDS milestones goes to their 3rd stage of training which has considerably more EPAs than others. However, this element will tend to prove irrelevant as we progress with the comparison, a measure that will simply prove unachievable if we were to remain faithful to the original construct.

5. Notable distinctions of the local Moroccan Context:

Having secured our American and Canadian repositories of competencies and sub-competencies, we followed through with the step we described as contextualization of the elements of competency.

This required two efforts that were done simultaneously: was the aforementioned "Analysis of physician activities" expected to result a sum of activities and responsibilities stemming from the everyday practice of a Critical Care and Anesthesiology doctor. Evidently analysis of physician activities is done on university hospital departments where specialty doctors pursue their training. This element is essential as the milestones are a project management tool for residents' training which is only done in university hospitals and having a look into their activities offers an insight on themes of competency that we can expect to be developed and an insight on certain patterns of skill acquisition.

This analysis resulted in the conjecture of several characteristics regarding our adoption of the milestones:

First, and most obvious distinction in the Moroccan context, is that the specialty engulfs both the branches of Critical Care and Anesthesiology in one medical specialty. Therefore, there is no discernable distinction in the competencies required to ensure their daily proficient practice beyond the naturally different medical care skills and practices.

The two branches of the specialty are intertwined both in daily practical activities and receive equal attention during training and assigning hospital rotations and tend to converge consistently in competency components such as collaboration and professionalism.

Second, regarding the duration of specialty training, which in the frame of the current process-based education model lasts four years.

The competency approach re-iterates commitment that the competency structure is to be built in complementation of the current education model in order to drive it towards improvement, which is the main reason our structural affinity always drove towards a model that could merge with the four-year structure of training.

The structure we found to be most compatible with this is the five phases of the Dreyfus and Dreyfus stages of development with the fourth phase being generally referred to as the stage of being Proficient, the phase in which a practitioner is considered as having reached proficient autonomy in practice, found also in the ACGME milestones for anesthesiology and critical care with some eventual points of emphasis:

The ACGME tracks the progression in milestones through "levels", but we feel that the description "phase" is more faithful to the purpose of the milestones as a project knows phases of completion much more than levels.

Another reason is that the term "level" creates a confusion when used in contrast with the yearly levels of training whereas achieving sets of competencies or sub-competencies should not be restricted by time, it is perfectly normal in the frame of CBME, for a 2nd year resident for example to be proficient in an aspect of competency that is generally expected of a more senior resident, as much as it is perfectly normal for a senior resident to struggle with accomplishing milestones more adequate to more junior years or residency training.

Such a notion is also outlined in the 1978 WHO publication where the Mastery in program organization "means nothing more or less than achieving the degree of competence identified as the educational objective" and "makes no reference to the time it will be given to, or required for such achievement".

Therefore, to avoid restricting the description of progressing of "mastery", we elected to move away from the term "level" to a more context relevant term which "phase" where clearing a set of competencies or sub-competencies is regarded as clearing that phase of competency progression regardless of clearing the adequate level or year of training.

Another point of emphasis is the choice made regarding the number of phases. One cannot help but wonder: if competency is to progress through phases reaching an agreeable state of autonomy around the fourth phase, why does our milestones admit five phases?

Well, candidly and simply put, the idea of the inclusion of a fifth phase did come from the reviewing the Dreyfusian description of development of expertise that lead to the five levels in American milestones, Dreyfus and Dreyfus describe five phases, the fifth of which is the expert that "has an intuitive understanding of the situation and zooms in on the central aspects" and in the ACGME milestones, reviewing fifth levels throughout various themes of competency shows certain patterns of activity affixed usually to this level: Being a consultant, participating in developing guidelines usually in patient-care-centered milestones and a consistent role in driving ventures of innovation in others, fifth levels are designed to represent "an expert resident whose achievements in a sub-competency are greater than the expectation" but we do feel, through " Analysis of physician's activities" in our context, such a role is almost exclusively fulfilled by a senior specialist.

Even the use of the term consultant is intended to describe, in British healthcare, a physician or surgeon holding the highest appointment in a particular branch of medicine or surgery in a hospital. One who is asked to confirm a diagnosis or provide an opinion. Such descriptions are evidently, akin to a professor of the specialty in our context.

That prompted exploration of an opportunity to expand the range of the milestones we are developing: As per the objectives we have already outlined for this framework, we aim at guiding acquisition and maintenance of competency for graduated specialists in Critical Care and Anesthesiology, using the Competency dictionary part of the framework as it has to be inclusive

of specialists in public and private practice. And while milestones interest training, they are designed in the frame of the institution: therefore, they can be used to elaborate more on competency expectations of specialists following the structure of the public health institution in which post-training specialists are either solely public health professionals or public health professionals who are elevated to academic responsibilities and faculty roles as professors of the specialty.

The initial four phases are well equipped to guide competency towards proficient autonomy and the practice as a public health professional of Critical Care and Anesthesiology, serving up of a fifth phase modeled after desired competency roles that are often assumed by our senior figures can help track the institutional progression of competency beyond the specialist, but also instruct the junior colleagues and specialists on the expectations awaiting and what it takes to assume academic roles.

A fifth phase is also a perfect opportunity for professors of the specialty to be leaders by example in embracing competency as a vital determinant of practice.

Another side of the objectives sought by this framework is establishing an environment for future improvement and refining through further thematic specifications that can interest any facet of competency: thematic specifications usually have the form of practical guides that can expand on each milestone, zoom in on one of its elements and guide practical acquisition.

Besides being competency or milestone specific, practical guides can also be phase specific and each phase will then have a clearly outlined path towards its achievement which will significantly boost the speed as well as the efficiency of learning in a residency program and make any implementation of CBME particularly successful and particularly useful.

Subsequently, a lot of the resulting sub-competencies often do reference the role of professors in drafting practical guides that ease the acquisition of competencies for residents.

Another element of "analysis of physicians' activities" is discussing the components of training which requires establishing a repository of local, institutional, standard procedures followed in daily departmental practice. Practice tenets tend to differ across different curriculums, and dissimilarities arise even in medical and scientific predominant competency themes like patient care. Taking notes of point of stark contrast with other framework is a must as they risk invalidating certain competencies or sub-competencies considered incompatible with the local context.

This is particularly present in competency themes revolving around ethical considerations, professional and behavioral skills: the local inventory of competencies in those fields is governed not just by daily practice by the directives, rules and regulations of SMAAR, the body responsible for the implementation and the viability of CBME as an option of improvement of the training outcome. This implies that an eventual taskforce aimed at evaluating the conformity of the resulting milestones under the flagship of SMAAR will not be solely be composed of our trusted professors as specialty experts but also other relevant effectors in an effort to emphasize commitment to consensus and inclusivity in our framework.

Commitment to inclusivity is a result of the evident absence of agreed core competencies in general care. Several other frameworks outline specialty competency in line with the broader specter of core competency and sometimes even see their relevancy to the specialty linked with their relevancy to the general description of the competency requirement of the medical doctor, elements like communication with patients and relatives for example, is a competency theme not limited to Critical Care and Anesthesiology and while it has some contextual specifications, it is largely a competency theme every medical doctor, specialty or no specialty, ought to be proficient in.

Finally the component of training that completes the circle, usually more thoroughly discussed in post implementation phases but absolutely essential nonetheless which is Assessment, outlined in its separate section of discussion.

6. The Adoption of the four skill groups: objectives and reasoning:

After accumulating repositories of competencies and an observation of the local Critical Care and Anesthesiology physician's activities, the second effort necessary to ensure proper contextualization is the establishment of four skill groups or four skill families that carve up competencies along the lines of its most compatibles themes and subsequently the most compatible groups for foreign core competencies.

These skill families were chosen with certain objectives in mind:

As we keep iterating throughout this work, the evident lack of local core competencies for family medicine and general practice that always constitute the scaffolding of any specialty specific endeavors.

Not only there is a lack of local core competencies, there is an absence of consensus on which of the pre-existent foreign core competencies is most compatible with our context: case in point being the two experiences with CBME described earlier, where both experiences faithfully adopted two different frameworks in CBME in their works, with one being the core competencies by the ACGME and the other being the EPAs and the Canadian core competencies.

The four skill families is an attempt to circumvent the local lack of core competencies and the lack of consensus to an area where there is local consensus, which is the Competency Dictionary designed to revolve around elements of knowledge, skill and attributes, three callable domains to our four skill groups and exempt us from adopting the structure of one of the two frameworks of competency, which would rob us of our operational goal for this framework by preventing us from serving our context in exchange for the safety of the notion of pre-existent or pre-tested model.

Moreover, adopting the structure of one the models tends to cancel out benefiting from the other, as their structures while similar are fundamentally non superposable. Had it been the case, one of them would have disappeared or aborted a significant while ago. Such a tradeoff is incompatible with our agenda, of extracting as much data from both models and sorting it as we

see fits our operational goals with a minimal to no bias, provided that it would be a bias of compatibility or meaning.

In this particular instance, adopting the four skill groups allows through its broad range the process of providing an environment of compatibility through the "identification of clusters" as mentioned in the 1978 publication and the creation of new collision points between the two repositories which applying proper manipulation would result in an even more inclusive description of competency-elements conforming to what we describe as competency.

Adopting a wide range in the frame of these four skill families is also in line with one of objectives of the framework of competency as a whole, as it is to allow enough space to accommodate the future changes and improvements we bet on seeing, as they are indicators of the vitality of the approach and the measurable improvements it lead. Modifications can be motivated by future efforts or taskforces to update or improve our model in the limits of the specialty or as a response to a bigger call to reform them according to the eventual development of Moroccan core competencies for family and general medicine in the frame of CBME, in which a remodeling of the approach of CBME in the specialty of Critical Care and Anesthesiology will be implemented.

Such future efforts will benefit more of a model with skill families having a wide range allowing them operational freedom and the capacity to carry on some of the notions of our approach more so than an over specified approach that seeks a misplaced sense of safety that will see our product milestones either be of little contribution to future developments or simply see them stricken off and completely redone.

Thus, the four skills groups were established which are namely:

- Practical care skills
- Collaboration abilities
- Healthcare professional attributes
- Medical knowledge development and scholarly activity

These were drafted and deployed as the themes of competency in our context, akin to core competencies in American or Canadian approaches, and will be the determinant of the rearrangement of the American and Canadian repositories of competencies along the lines of those themes.

Patient care skills stand for the competencies desired to be able to administer medical care in its technical sense to patients in Critical Care and Anesthesiology, they outline interface with those patients as clinical presentations and usually refer to evaluation, planned management and associated technical skills to practice. These are quite clear cut, hardly ever confused with other themes of competence, they mirror the milestones in Patient Care in the ACGME frameworks and the Medical Expert (ME) canMEDS milestones and their dominant EPAs. Most of the content of repositories addressing this theme converge on the same points of focus.

Another skill group shares the same properties which is Medical knowledge development and scholarly activity which stand for the competencies desired to be able to display specialty specific knowledge in physiopathology, pharmacology as well as the capacity to interact with specialty specific literature to improve one's knowledge acquisition or even enrich that literature. And while it does admit a light shade of professionalism in the commitment to continuous development and learning, this theme is hardly confused with other themes of competency and largely mirror milestones of Practice-based learning and Medical knowledge in the ACGME frameworks and Scholar (S) in the canMEDS milestones and their dominant EPAs. The content of repositories addressing this theme significantly converge on the same points of focus be that to a lesser extent than Patient Care.

The other two skill groups, Collaboration skills and Healthcare professional attributes, were designed as cohorts of competency elements that seemed to have a compatibility of themes and their sub-competencies tend to support each other's' achievement.

Collaboration skills outlines a cohort of desired sets of competencies that allow the practitioner to proficiently function within the frame of a body of healthcare professionals and workers, whether it's inter personal communication skills, the ability to integrate teamwork and eventually be in a position of leadership of that team, or the capacity of coordination within the institution through the proper channels of communication with its several components. Collaboration skills tend to cover a wider range than the previous two, as they mirror, several elements mainly from Inter-personal and Communications skills and System Based-practice milestones in ACGME milestones, and a cohort of canMEDS consisting of Communicator (COM), Collaborator (COL) and Leader (L) milestones and their dominant EPAs.

Healthcare professional attributes, outlines a cohort of desired sets of competencies that allow the practitioner to proficiently manage the ethical debate emanating from Critical Care and Anesthesiology practice, in a specialty that deals with patients going through situations of immense physical and moral vulnerability and human suffering associated with a complete lack of human autonomy and free will. Being entrusted to oversee the care of patients in such a condition requires adhering to a significant moral high ground and for that adherence to be a vital element of competency. Acquisition of this element of competency requires measurable ethical commitment, patient security commitments, a multi-faceted role as a public health professional and the capacity to display this sense of professionalism effectively. Healthcare professional attributes tend to cover a wide range much like collaboration skills as they mirror several elements of the ACGME milestones: those being mainly Professionalism and System-based practice milestones with Interpersonal and Communication skills being present but to a much lesser extent, as well as elements of canMEDS milestones specifically the ones corresponding to canMEDS Professional (P) and Health advocate (HA) with a slight presence of Leader(L) milestones .

The rearrangement of the American and Canadian repositories of competencies can be then recapped as the table chart outlined in the methodology section as such:

	CanMEDS milestones	ACGME milestones
Patient care skills	Medical Expert (EM)	Patient Care
Collaboration skills	Communicator (COM) Collaborator (COL) Leader (L)	Systems-based Practice Interpersonal and Communications Skills
Healthcare professional attributes	Professional (P) Health advocate (HA) Leader (L)	Professionalism Systems-based Practice Interpersonal and Communications Skills
Medical knowledge development and scholarly activity	Scholar (S)	Medical Knowledge Practice-based learning

This rearrangement was done to see the elements of the repositories, which were initially listed as described earlier according to their respective milestones, lose constricting ties with those original affiliations, that is why the rearrangement wasn't applied to milestones or EPAs as a unit but extended to the sub-competencies and micro-elements of the competencies. It is one of the reasons of the noteworthy discard in our skill groups of separate categories like system-based practice or inter personal communication, as we found that their sub-competencies in their original forms can be treated separately from the core competency and assimilated in the bigger structure that is our skill groups which broadened the specter of those skill groups all the while maintaining an operational description of essential competency due to affinities found between several sub-competencies originally belonging to different core competencies.

The most basic example for this is the communication in the health care team which wasn't treated separately or required to belong to one skill group because it was found to be much more meaningful to examine the competency aspect of communication in the health care team in several distinct frames like care tasks and care transfer in institutional collaboration

which is on one hand more similar to system-based practice in the ACGME models, and communication in resolving inter personal conflict which closer to and aspect of Professionalism in both our approach and the ACGME approach. Applying this all across the board saw the dissolution of units such as interpersonal and communication skills and system-based practice and the assimilation of their sub competencies in the four skills family, providing just about enough of a large specter to maintain the specificity

7. Drafting our Milestones following rearrangements for compatibility:

Having secured this significant amount of competency descriptions that are now substantially compatible thanks to adopting the four skill groups, work began on drafting our own milestones.

As described in earlier section, retailing these competencies in a massive array, requires two elements: a content compatibility and a phase compatibility.

The progression of competency differs between the two models with one admitting five "levels" and the other admitting four "stages of training". And while these are not directly mirrored, the ACGME describe their level of acquiring autonomous practice at level 4 while the Canadians describe their fourth stage of training as "transition to practice" which is congruent with autonomous practice. Decisively, description of the Canadian competencies of the stage of training "transition to practice" applies to levels 4 and above in the ACGME.

And since we elected to adopt 5 phases in our progression of competence, such a manner to adjoin the American and Canadian repositories is justified: Transition To Practice EPAS, their key features and canMEDS milestones will be correlated with level 4 milestones of ACGME with reserved consideration of its correlation with level 5 milestones as they would result in phase 5 competencies which we elected to model after senior figure roles in institutions.

Subsequently, the first three "stages of training" will be correlated with the first three "levels" of competency. However, this also admits several particularities regarding the deployment of canMEDS milestones which are rather standardized and do not admit a clear pattern of progression. This was overturned on one side by examining the EPA name and key features where we do find a palpable sense of progression that can be correlated to their American counterparts , on the other side, the use of the description of the canMEDS milestones, to "manually" decide which is the most appropriate way to correlate it while satisfying content compatibility.

A basic example for such a process is the manipulation of the EPA dealing with performing procedures, quoted earlier and purposefully chosen here as an example for the continuity of the process, displayed throughout its perceived pattern of progression outlined by The EPA name and key features:

Stages of training	Transition to Discipline EPA	Foundations EPA	Core EPA	Transition to Practice EPA
Patient care skills (one of the four skill groups) competency description (Dominance by EM canMEDS milestones)	**Performing the basic procedures of CCM (EPA name):** • Bag-valve-mask (BVM) ventilation with oropharyngeal airway (OPA)/nasopharyngeal airway (NPA) insertion • Chest compressions and defibrillation • Routine arterial line insertion, central venous catheterization, intra-osseous placement **(CanMEDS milestones:)** ▪ Case preparation: Patient correctly prepared and positioned, understands approach and required instruments, prepared to deal with probable complications ▪ Knowledge of specific procedural steps: Understands steps of procedure, potential risks, and means to avoid/overcome them	**Performing the common procedures of CCM (EPA name):** • Airway management skill in uncomplicated patients • Arterial line insertion in complicated patients • Cardioversion • Central venous line insertion • Chest tube insertion • Lumbar puncture • Paracentesis • Thoracentesis • Transcutaneous pacing **(CanMEDS milestones:)** ▪ Technical performance: Efficiently performs steps, avoiding pitfalls and respecting soft tissues ▪ Visuospatial skills: 3D spatial orientation and able to position instruments/hardware where intended ▪ Efficiency and flow: Obvious planned course of procedure with economy of movement and flow ▪ Select and interpret the results of investigations and imaging	**Performing the advanced procedures of CCM (EPA name):** Brachial arterial line insertion Central venous line and dialysis line insertion in unstable or complex patients Bronchoscopy Conscious sedation Intubation in a patient with a difficult airway/unstable situation Point-of-Care Ultrasound (PoCUS) Transvenous pacing and/or testing of pacers Pulmonary artery catheter insertion **(CanMEDS milestones:)** ▪ Adjust instrument settings appropriately to optimize image quality ▪ Obtain standard views ▪ Recognize clinically significant findings in a POCUS examination ▪ Prioritize a procedure or therapy, considering clinical urgency and potential for deterioration ▪ Demonstrate situational awareness, avoid fixation error ▪ Manage hemodynamic support and monitoring ▪ Integrate planned procedures or therapies into resuscitative efforts	No EPA is found to be a progression of the earlier EPAs.

The described pattern of progression is the transition from "basic" to "common" to "advanced" in describing the procedures to be carried out, it is also seen in the gradual addition of procedures of increasing degrees of complexity.

As far as canMEDS milestones, compared to their original, some were flat out discarded, some are given the character color green meaning they were mentioned in that EPA and that "stage of training" which means they preserve their original affiliation, some are given the character color blue meaning they were enlisted post the first rearrangement in an earlier stage of training of the EPA but are now affiliated with another, the example outlined being these canMEDS milestones previously listed in "transition to discipline" but were judged to be more compatible in a comparison context with " Foundation EPAs", and some were given the color red meaning they would be canMEDS milestones imported from a different EPAs completely unrelated to the progression of this specific EPA but found to be quite useful in this context as a competency description.

This example is particularly representative of our final interaction with the Canadian repository as it shows that sometimes EPA competency progression reaches their end in the third stage of training, and as incompatible as it is with our five phase progression system, it just serves to show why we are absolved of any loyalty to the original disposition in using those competency description and that is where the aforementioned content compatibility takes the proper lead.

Applying the same process to the entirety of the Canadian repository provides an operational form of Canadian milestones ready for the integration in one array with the ACGME milestones and their sub-competencies to commence the drafting of our own milestones.

The spreadsheet outlining the drafting as shown in the methodology section shows that we opted to refer to the title of the group of outlined elements of competency as " Définition thématique de compétences ou habilitées" or thematic definition of skill, which references the aspect of a profile constituted by a sum of progressive competencies that revolve around particular theme of competence, which is very evocative of the EPA. Achieving these would mean progression in that theme of professional activity that is entrusted to a Critical Care and Anesthesiology doctor throughout their training.

These progressive competencies were designated " Jalons" or Milestones referring to the basic definition of milestones as a project management tool, where achieving them phase by phase signs the progression in that theme of competence towards a proficient autonomy of practice.

The constant presence of the French language in discussing methodology is a conscious choice as it serves to stress the fact that the language of choice for the drafting of our first attempt of milestones of the specialty is the French language. Such a choice is imposed by the local context and reaffirmed by local expert recommendation : drafting this model in French will render it way more accessible to all doctors of the specialty who might struggle still with a language barrier, it will render it more easy to propagate and explain, both in content and in intention and it might even reduce some of the natural human negative bias towards structural change that would definitely be exacerbated by installing an unnecessary language barrier, deemed unnecessary as there is a French language version of the Canadian framework that facilitated the making of the repositories of Canadian competency descriptions in French and the drafting of coherent set of milestones.

The comparison and hybridization process was done as described in the methodology, on each sub-competency and EPA name and main feature because it serves several purposes: first and most evident is the fact that it objectively facilitates the effort of comparison between the American and Canadian descriptions of competency, second because it facilitates for us, while doing that comparison or hybridization, to inject the elements of the third repository resulting from " Analysis of physician's activities" reflecting local, institutional, standard procedures which is vital if the resulting milestones would be relevant to local context. And third but most important, is that each of the resulting milestones need to have a clearly outlined process of manufacturing, detailing which American or Canadian component they might drive structure from, milestone by milestone, as it would significantly ease any effort of reassessment of any particular milestone ahead of an eventual update or modification. An aspect we have already stressed that is vital for the survival of any competency approach.

Another note on the comparison and hybridization of the sub-competencies and the compatible EPA features is that the process was also done phase by phase from phase 1 to phase 5, each section of the array deals with a phase and the separation was done to foster two separate commitments requiring equal consideration, first is the coherence of the resulting milestones on the continuum of progression between each other within the phase as well as their commitment to describe competency within the chosen thematic for that element of competency. Second is that it evidently allows to track coherence of resulting milestones throughout the five phases.

Rerunning this process crowned our efforts with the first set of milestones in Critical Care and Anesthesiology in Morocco, that describe the progression of competency in its themes through five distinct phases, achieving the fourth of which signs autonomy in the lens of competency and proficiency, and they are displayed in the methodology and results sections in their table structure.

This form of display was inspired from the ACGME milestones worksheet as we do share a similar progression pattern from 1 to 5 and especially that we do concede the visual presentation of the milestone in one table including all the phases does facilitate for the users, the tracking of the pattern of the progression, initially positioning themselves on that continuum of progression during their initial contact and eventually tracking their own progression on that continuum.

8. Drafting our Competency Dictionary:

Having materialized a conception of our own milestones, the discussion naturally moved towards completing the second component of the dualized structure of our framework which is the Competency Dictionary. Methodology describes the use of phase 4 milestones in the drafting of this Competency Dictionary in order for it to be subsequent to the progression of competency outlined in the milestones. The sum of phase 4 milestones and the competency Dictionary both imply a complete profile of competencies that are desirably met to confer to the practitioner attributes such as proficient and autonomous. This concept was aforementioned as a major facet of compatibility stemming from the perceived warranty that it would be the best way to ensure that the tools enjoy a complete compatibility of addressed themes of competency.

Competency Dictionaries have a variety of processes of development that are sector dependent, some opt for defining four dimensions for competency seen in a report mapping competence by Barrett, Martyn (2009) (51), outlining the four dimensions as Knowledge, skill, behavior and attitudes, which are very much evocative of the four skill groups we adopted.

Skill would mirror the Practical care skills, knowledge would mirror the Medical knowledge development and scholarly activity competencies, behavior would mirror the Collaboration abilities and finally attitudes would mirror Healthcare professional attributes.

However, Competency dictionaries that are sanctioned by the Moroccan health ministry are based on the ones sanctioned by the French government and those admit only three main areas of competencywhich are namely: knowledge ("Savoir"), skill ("Savoir-faire") and attributes ("Savoir-être"). Luckily the previous mirroring holds where attributes would encompass the competencies relating to both cooperation capacities and attributes of professionalism as these are the epithets that need characterize a proficient healthcare practitioner.

And as long as our four-skill group is superposable on the competency areas expected of a Competency Dictionary, they can be directly applied, solidifying ever more the compatibility of the themes with the milestones and complementarity of the two tools in our framework.

As the themes were fixed in our competency dictionary, the process of drafting was carried out including, as described in the methodology, an effort of re-wording that would see competencies group together all the significant points of progression in one competency description. It also includes some milestones that are not exclusively phase 4 especially if their mention is vital to the theme or their progression was completed before the fourth phase.

A basic and very representative example of this is the very first theme of competence which is outlined in the results section of our work, evidently displayed in French:

<u>Évaluation des patients et développement des plans de soins :</u>

- Évalue et identifie les différentes présentations cliniques courantes et atypiques et indique les différents examens paracliniques adéquats.
- Etablit l'ordre d'urgence et l'ordre de priorité.
- Développe un plan de soins complet ainsi qu'un plan d'évaluation continue.
- Adapte les plans des soins au fil de l'évolution de l'état de patient.
- Sollicite les avis des collègues et autres spécialistes afin d'optimiser la prise en charge
- Utilise les ressources limitées d'une manière judicieuse au moment de crises.

The first competency outlines in its first part a pattern of progression regarding the clinical presentations from just initial diagnosis, to common to atypical with its last part stressing a competency elements from phase 1 but judged vitally important and therefore must be included in the ultimate description of this competency, second and fourth competencies are mostly associated with phase 3 while the rest of the milestones are all phase 4.

Such considerations were also done all across the other milestones in order to obtain a competency dictionary that is both coherent and representative of the essence of the competency themes and their four skill groups.

IV. An Outlook on Assessment:

While the main goal of our study, is elaborating a framework that defines competency, in the bigger frame of competency-based medical education, no educational paradigm can hope to see the proverbial sunlight without addressing one of the most vital pillars of any educational paradigm in contemporaneous education, which is assessment.

Assessement, described by J.Gervais 2016 (52) " as a key component to student learning", takes on a major role in ensuring the survival of the objectives of any modeling of educational frameworks as it is the main component that lays foundations for evaluating a form of measurable benefit or utility for the adoption of that model.

It is the first line of evaluation of whether there is any palpable growth in the rate of acquisitions desired, as well as satisfying the social responsibility of providing a clearly defined standard indicating sufficient preparation for unsupervised practice.

Assessment is also the most demanding discussion subject in education models, because it is often staggering and the process of development and decision-making of assessment modalities often isn't concluded until well after the implementation of an education model. This is due to the fact that such a process is consistently associated with either dissolution or reshaping of current assessment procedures, which results in eventual legislative, administrative

and certification blunders. Another reason is the fact that it consistently demands redistribution of institutional and faculty resources to accommodate the new assessment method as well as form the assessor and the assessed to properly use this new method.

For CBME, the assessment debate has been present since the very beginning of the competency-based education, as it pertains to one of the main aspects of distinction between it and the process-based education that has dominated teaching generally and in the medical field specifically.

This aspect of distinction is simply the examination process. Process-based education reveres the defined sequential process of education or training that ends in an examination meant to validate adherence to that process and mainly evaluate the amount of knowledge acquisition, whereas competency-based education aims at defining an outcome that must be met where examinations favor validating achievements of the desired outcomes more than validating the process of their achievement. Put in simpler terms, process-based assessment reflects achievements in a more academic sense, with the assumption that it is a suitable predictor of the ability to demonstrate professional competence, this has been proved consistently wrong as the best way to predict future competence in a practitioner is through assessing the current one.

The diverging goals of assessment imposes structural differences that are usually outlined in a form of comparison. Such is the table adapted from (Carraccio et al 2002) (11):

A Comparison of the Elements of Structure- and Process-based Versus Competency-based Educational Programs

Variable	Educational Program	
	Structure- and Process-based	Competency-based
Driving force for curriculum	Content—knowledge acquisition	Outcome—knowledge application
Driving force for process	Teacher	Learner
Path of learning	Hierarchical (teacher ⇒ student)	Non-hierarchical (teacher ⇔ student)
Responsibility for content	Teacher	Student and teacher
Goal of educational encounter	Knowledge acquisition	Knowledge application
Typical assessment tool	Single subjective measure	Multiple objective measures ("evaluation portfolio")
Assessment tool	Proxy	Authentic (mimics real tasks of profession)
Setting for evaluation	Removed (gestalt)	"In the trenches" (direct observation)
Evaluation	Norm-referenced	Criterion-referenced
Timing of assessment	Emphasis on summative	Emphasis on formative
Program completion	Fixed time	Variable time

The comparison between the two approaches of assessment, shows that the elements of assessment in CBME resulted from an evolutive critical description of the traditional assessment tools.

In fact, such critics date all the way back to the beginning of the discussion of CBME, it was described by Bryant J in 1969 (53), featured in the 1978 WHO report as "the least understood and most misused tools of education". This was because examinations were and still are often used to verify the intake of an amount of knowledge regarding a specialty or a subject. These would usually have enough range that sometimes-learning only sections of them coupled with a disproportionate amount of luck and bias towards objectively useful themes of a subject, tends to cover succeeding a written or oral examination. Conversely doubling-down on peculiar examination themes to defy bias would rob the assessment of the entirety of its purpose. And in both cases, the examination seems to mostly assess only sections of the specialty or subject.

This in regard to outcome-based assessment is simply inadequate and insufficient as knowledge or knowledge acquisition are but one of the many facets of competency as a practitioner, whether in our framework, the American, the Canadian or any other effort outlining competency in practice in and out of the medical field.

Therefore, several attempts at re-designing assessment were made since the beginning to remedy these inadequacies.

1. Formative and Summative assessments:

Early attempts relevant to assessment in the specialty, describe two main forms of assessment in CBME as: formative, assessment and summative assessment.

Summative assessment equated in traditional approaches the examination process that takes place at the end of a usually large educational unit, like the end of a term or the end of a training level. The examination is usually single method and its material is built on the curricular content previously presented to the learners, most often as academic courses and scientific literature. The examination is standard and the learners are graded and ranked in what is called norm-referenced manner or simply in comparison to each other.

In CBME, summative assessment takes on a slightly different description as it is seen coupled with the formative assessment.

Formative assessment is meant as a system of continuous and non-judgmental set of assessments that are not intended to grade and rank but most importantly to guide and remedy deficiencies in the training or acquisition of a learner. Formative assessment differs mainly then by the fact that it maps the educational process with guideposts and pathways all leading up to mastery of a pre-defined professional competency. Formative assessments will be spread throughout the entirety of training and will be centered not on a standard exam describing the process but on outcomes and whether those outcomes have been met. This eases the shifting of assessment to a more learner-centered procedure giving insight into what was learned and what has yet to be learned. Going through a multitude of formative assessments will allow the learner to remedy most of the weakness that cannot be carried into independent practice and generally improve their practice habits as seen in a study by McKinley et al 2000 (54) where formative assessment was found to improve consultation performance in medical students, where the vast majority of students found that their perceived particular strengths and weaknesses were correctly identified through formative assessment, as well as acquiring specific advices and feedback that would have long-term benefit.

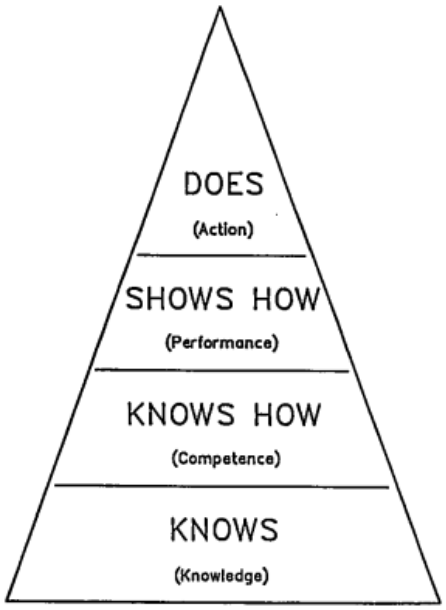
Sufficient and frequent formative assessments or formative feedbacks as they are referred to in more recent works, when they are properly used will lead up to a summative stage of assessment that is a point of quality control or judgement carried out to validate the outcomes of the formative assessment.

Several models coupling summative and formative assessments are being proposed until this day, in and out medical education, because they don't impose replacement of traditional assessment but redesigning it as well as being compatible with other methods in competency-based models, which part of the reason that their place in the competency assessment debate often no longer labels them as a "method " of assessment but as " timing" of assessment as done in the table by Carraccio et al 2002 (11).

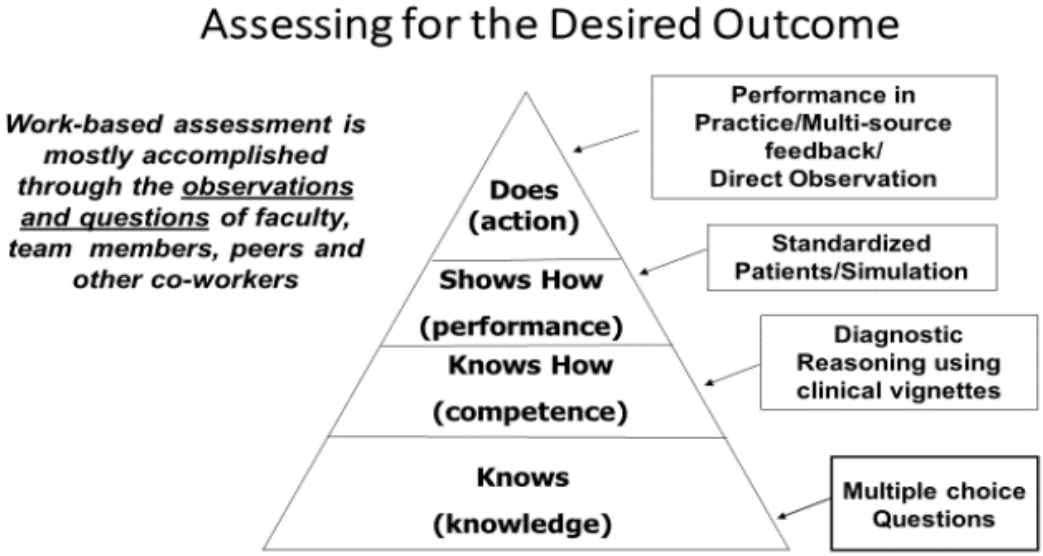
In fact, shifting away from replacing to supplementing or partly redesigning traditional assessment is a trend that picked up significantly through later discussions on assessment following the realization that despite its critics, process-based education is still the main approach of education in medical and non-medical settings, and the assessment approach that comes from it enjoys too much administrative, legislative and structural roots embedded in the educational process, making it evident that it will not be going away anytime soon. This is where ideas such as a shift from assessment of learning to assessment for learning described by Martinez & Lipson (1989) (55) incites planning better assessment that takes on a pedagogic role, in which "testing and teaching complement and reinforce one another".

2. Miller's Pyramid

Designing frameworks of assessment in CBME did pick up as a major part of the competency debate in the 1990s, seeing the birth of the Miller assessment pyramid (Miller 1990) (56): which was seen as an important move away from the traditional Flexnerian medical education (Witheridge et al. 2019) (57)



This pyramid outlines a form of transition from cognitive elements of competence which are the base of the pyramid to more behavioral elements that constitute the two top levels of the pyramid. Readapted by the ACGME (58) to show correlation with palpable assessment methods relating to each level of the pyramid:



Miller's pyramid is helpful in providing a plan of construction that guides programs in building assessment models, consisting of a set of inter-dependent types of acquisitions that need to be assessed by a variety of methods and tools, a consistent acknowledgment shared by most of the proposed frameworks of assessment is that a single assessment method does not provide any form of sufficient data on overall performance.

As far as Miller's, the ACGME regards that residency programs should place their emphasis on the top of the pyramid which the Does level, which requires attention to work-based assessments. (58)

This is justifiable in most contexts including our own as the outcomes assessed in the does level are the ones most taken by the practitioner into their independent practice.

3. The Portfolio construct of assessment:

Another particularly significant product of the nineties was the advent of the Portfolio construct of assessment in the frame of CBME.

Portfolios have been going through their own continuum of development for the last three decades, from early works such as Olson 1991 (59) and Bennett and Ward, 1993 (60) to more operational definitions and structuring by Tillma 1998 (61) and 2002 (62), Ben David et al 2001 (63) and Holmboe 2006 (64), portfolios seemed to secure a consistent mention in the assessment discussion for most CBME focused frameworks and a particularly prominent testament to that is its inclusion in both the ACGME's early general considerations on mapping assessment by Susan R Swing in 2000 (65) and the more modern version that the assessment guidebook compatible with Milestones2.0 in 2020.(58)

Throughout the macrocosm of descriptions, definition of portfolios always circled around it being a collection of works, evaluations, feedbacks and self-assessments grouped together to form valid evidence, if properly interpreted, demonstrating the progression of a learner or a trainee through their own journey of learning, describing a pattern of acquisitions in line with

adopted core competencies in every framework that grants the portfolio a capacity to serve purposes of both summative and formative assessments.

The validity of this definition is however subject to a commitment required of the learner and his assessors, to certain structural characteristics grating it the epithet of a "Comprehensive" portfolio.

These Key characteristics are adapted from the ACGME 2020 assessment guide, after review of several other works describing largely similar characteristics such as Swing 2000 (65), Holmboe 2010 (66), McMullen et al 2002 (67), Tillema 1998 (61), outlined as such:

1) A multifaceted approach to assessment
2) Assessment based on "triangulation" –assessing multiple domains of competence and utilize multiple assessors
3) Longitudinal and iterative content established through the interaction of the learner and faculty assessor
4) Learner self-assessment and reflection
5) Evidence of meaningful learner engagement demonstrating professional growth
6) And portfolio development and use that is transparent to the learner – learners should have full access to content and a sense of portfolio "ownership"

These characteristics are essential not only for the parameter of validity of the portfolio as an assessment tool, but also to ensure that the portfolio, a structure that has known many types and purposes throughout its evolution, is compatible with evaluating any aspect of competency it is presented with. This has not always been the case as the very first conceptions of portfolios were meant as tools of assessment of competencies that are difficult to clearly measure like professionalism and system-based practice. And while such recommendations are

still affixed to portfolios in CBME, most contemporaneous recommendations deter from falling in limitations of reductionist assessment portfolios in favor of a large or "comprehensive" range.

Another issue that imposes these characteristics would also be the constant risk of wasting all the resources, time and effort on implementing a form of portfolio that ends being a stagnant collection of mandated evidence of performance without appraisal and scrutiny of that performance by a third party or through self-assessment which is essential for developing proper improvement directions necessary for growth. Portfolios have a lot of potential uses in CBME as they help create databases and repositories of standards of physicians' performance which helps incite, inter alia, continuing medical education programs in the frame of re-certification as explored by (Bashook et al. 1998) (68).

4. The Utility Index for Assessment and the notions of Validity and Reliability:

Other researches (Cronbach 1971 (70); Messick 1989 (71); Pedhazur & Schmelkin 1991 (72); Kane 1992 (73); Messick 1994 (74); Foster 1995 (75); Epstein 2002 (42); Cook 2006 (76)) took a look at several mostly single method assessments in hopes of highlighting their outcomes and attempt to benefit from them through their practical implications as well as open other research suggestions. One among the worthiest of mention is the work introducing a Utility Index for assessment meant to ease trade-offs or compromises by taking in consideration several variables each having its own weight in the utility and therefore validity of the assessment.

This work by Van der Vleuten 1996 (69) defines "the utility (U) of an assessment method as a multiplicative function of these variables with differential weights (w)" or:

Utility = Rw X Vw X Aw X EIw X Cw

where R = reliability, V = validity, A = acceptability, EI = educational impact, and C = cost.

Light is shined however, on the importance of personalizing weights to specific situations in which the assessment method will be used in and with the fact that some of those elements might not even be measurable, its multiplicative nature is meant to make it clear that if one of those elements is non-existent or of zero weight, then the utility of the tool is therefore nulled.

In fact, this idea of context dependent weight in these elements of utility as well the notions of Validity and Reliability have been subject to research for almost the past sixty years.

Validity and Reliability are often viewed to be the ground of quality evaluation of an assessment tool and are often discussed as not an evaluation of the tool itself as much as the evaluation of the meaning of the scores of said assessment tool in the context it was used in, and how well one can legitimately trust the results of an assessment tool to support the theory outlined in the development of said tool.

Several aspects of judgment of validity were made based on scores starting with earlier paradigms distinguishing evidences of validity such as : Face validity: whether the tool appropriate for a particular use, Content validity: whether the tool is capable of stimuli of relevant responses, Criterion-related validity: whether responses to the test stimuli relate to other current or future responses in the same tool or in another, and whether predictions based on test scores add incremental value in decision-making.

Whereas more modern and more medical education relevant works tends to join those aspects of judgement of validity in a unitary concept of "construct validity": as the degree to which scores of the assessment tool can be interpreted as consistent with theory, with arguments of "construct validity" now collected from five sources: Content: whether instrument items completely represent the construct, Response process: the relationship between the intended construct and the thought processes of subjects or observers, Internal structure: acceptable reliability and factor structure, Relations to other variables: correlation with scores from another instrument assessing the same construct, Consequences: do scores really make a difference in decision-making. Such construct validity is discussed in the frame of psychometric

instruments used in assessment of education, whether those instruments take the form of written exams such as multiple-choice question or the form of Objective structured clinical examinations (OSCE) such as simulation and other forms such as Mini-CEX.

Discussions on utility, validity and psychometric models were done in the frame of developing sets of criteria that made adopting certain tools or mindsets when planning an assessment, more beneficial in their role of optimizing the learning process and to be more in line with the theory objectives of the educational paradigm that is followed.

That entailed advents like the programmatic assessment meant to double down on the switch from assessment of learning to assessment for learning mentioned earlier by establishing a cohort of assessment sources each drawing, in CBME, the assessment of a domain a competence, with learning experiences and teaching tailored to those competencies, all working in tandem to supplement the already adopted assessment approaches through developing their psychometric basis, described by Schuwirth et al 2011 (77) and Van Melle 2018 (78).

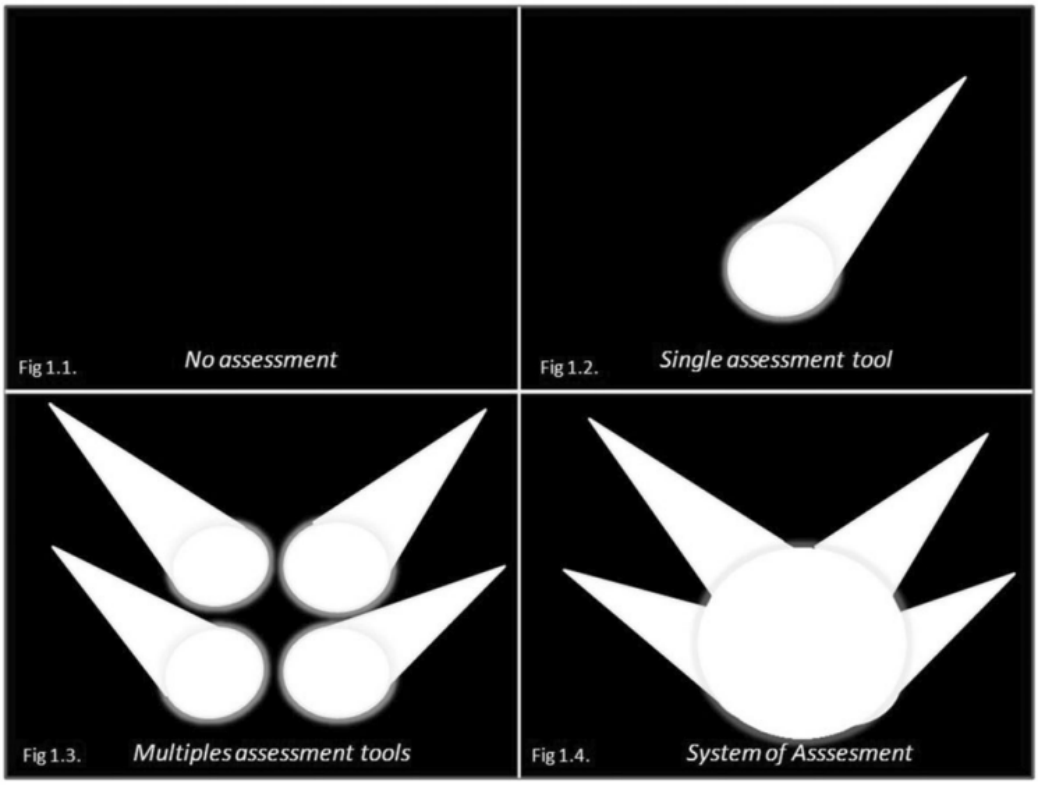
5. The consensus on the Criteria for Good Assessment in CBME:

But perhaps the most relevant works regarding what constitutes good assessment is the consensus reached by Norcini et al 2010 in the Ottawa project (79) and Norcini et al 2018 (80) that mainly outline respectively, the criteria for good assessment for single assessment methods (2010) (79) as such:

Table 1. Framework for good assessment: single assessments.

1. Validity or Coherence: The results of an assessment are appropriate for a particular purpose as demonstrated by a coherent body of evidence.
2. Reproducibility, Reliability, or Consistency: The results of the assessment would be the same if repeated under similar circumstances.
3. Equivalence: The same assessment yields equivalent scores or decisions when administered across different institutions or cycles of testing.
4. Feasibility: The assessment is practical, realistic, and sensible, given the circumstances and context.
5. Educational Effect: The assessment motivates those who take it to prepare in a fashion that has educational benefit.
6. Catalytic effect: The assessment provides results and feedback in a fashion that motivates all stakeholders to create, enhance, and support education; it drives future learning forward and improves overall program quality.
7. Acceptability: Stakeholders find the assessment process and results to be credible.

While the 2018 consensus (80) stresses that "Single methods of assessment are generally unable to capture all of these skills so multiple measures are needed". The presence of multiple assessment tool is not equal to having a system of assessment as those multiple tools must have be complementary in goals allowing the system of assessment to build a bigger picture on the acquisitions of the assessed as illustrated in the figure adapted from the same work:



All while describing, as done for single assessments, the criteria for good assessment for systems of assessment, outlined by Norcini et al 2018 (80) as such:

Table 4. Framework for Good Assessment: Systems of Assessment.

1. Coherent: The system of assessment is composed of multiple, coordinated individual assessments and independent performances that are orderly and aligned around the same purposes.
2. Continuous: The system of assessment is ongoing and individual results contribute cumulatively to the system purposes.
3. Comprehensive: The system of assessment is inclusive and effective, consisting of components that are formative, diagnostic, and/or summative as appropriate to its purposes. Some or all components are authentic and integrative.
4. Feasible: The system of assessment and its components are practical, realistic, efficient, and sensible, given the purposes, stakeholders, and context.
5. Purposes driven: The assessment system supports the purposes for which it was created.
6. Acceptable: Stakeholders in the system find the assessment process and results to be credible and evidence-based.
7. Transparent and free from bias: Stakeholders understand the workings of the system and its unintended consequences are minimized. Decisions are fair and equitable.

Evidently, the criteria figuring in single assessments focus on the build of the method and the core traits that grant each adopted method an operational and social credibility, and much of these criteria admit a visible pattern that tracks them back partly on one hand to the Utility index of Van Leuten 1996 (69) as these criteria do not have the same the importance or "weight" in considerations but need however be present, on the other hand, the resemblances to the "construct validity" described in the psychometric models by Cook 2006(76).

Combining single assessments affixed with a proper utility index leads to the system of assessment whose criteria's focus is evidently elements of coordination and harmony between its components, as well as a sense of purpose that imposes a certain range on the system that needs to be met if it is to fulfill that purpose.

One criteria shared by the system and the single assessments, one that is particularly relevant to our context, is the feasibility, sometimes merged with the cost for the single assessment criteria, is perhaps one of the most important pillars that would hold up any hopes of installing any form of assessment alien to the current assessment system regardless of whether that tool is compatible with the current system or not, especially in the absence of a will to reform in the structures in charge of educational and pedagogic decision making.

Which is part of the reason why such consensus criteria are rather helpful, since they grant unorthodox tools of assessment a ground of expert legitimacy as well as provide guidelines for mapping assessment in a way that despite not guaranteeing success, does help in designing operational and effective systems of assessment.

Keeping with the flow of the ever-changing, ever-improving guidelines of assessment planning, the ACGME had to mend its own guidelines on competency assessment established back through the work of Susan R Swing in 2002 (65) particularly with the introduction of the new accreditation system, specialty specific milestones and most importantly the publication of the products of milestones 2.0 in Critical Care and Anesthesiology as well as other specialties in the medical field.

In 2020, the ACGME published recommended assessments methods for each of their six core competencies in line with models like the Miller pyramid and the criteria for good assessment by Norcini et al 2018 (80). And since our dual framework does draw certain points of affinity with the ACGME milestones especially, the congruence between their level system and our phase system, it can be quite beneficial to have a look at the recommended assessment tools and their targeted competency outlined in their assessment guideline (58) as such:

Assessment Tool/Method	Targeted Competency
Faculty assessment (can be interprofessional)	Multiple competencies
Direct observation	Patient Care and Procedural Skills, Interpersonal and Communication Skills, Medical Knowledge ("in vivo"), Professionalism
Multi-source feedback	Professionalism, Interpersonal and Communication Skills, Systems-based Practice, Medical Knowledge
Audit and performance data (clinical and patient safety indicators)	Practice-based Learning and Improvement, Systems-based Practice, Medical Knowledge
Simulation (if available)	Patient Care and Procedural Skills, Interpersonal and Communication Skills, and Medical Knowledge
In-training exam (if available)	Medical Knowledge
Case or procedural logs	Patient Care and Procedural Skills, Practice-based Learning and Improvement
Patient experience surveys	Patient Care and Procedural Skills, Interpersonal and Communication Skills, Professionalism

In our efforts to find recommendations for assessment tools, The ACGME assessment tools were reviewed along with their respective descriptions and on the basis of applying good assessment criteria in our context. Compatibility was judged mainly through the lens of the following factors:

- Feasibility and cost: as we mentioned feasibility and cost are among the most crippling constraints that tend to cause any form of deviating from the traditional to be aborted immediately and consistently.

- Relevance to our four-skill group as this is still an assessment in the frame of our framework of CBME.
- Relevance to the assessment tools already adopted in our context: since our effort is designed to supplement and help better our current construct of training and assessment, the tools found to be already in use in our context, that we have in common with the ACGME model evidently admit a natural advantage
- Perceived validity and reliability in literature
- Perceived validity and reliability in our local context
- Coherence which is a term we use to underline mostly the lack of redundancies in the assessed aspect of the tool: each tool attributed to each group of competencies in our context is included because it provides a better assessment of a specific facet of that competency in complementarity with the other assessment tool, in line with the consistent recommendation of a multi coordinated system of assessment.

6. Operational Recommendation of an Assessment frame:

Establishing an operational recommendation does require a look at what assessment is composed in of on a national level throughout the training of Critical Care and Anesthesiology residents.

Supplementing the assessment locally in the frame of CBME, we do offer for consideration the following assessment systems composed each of assessment methods we found most compatible with our operational context, each system reported to their respective targeted skill group, outlined in the table below, followed by descriptions of those assessment methods respectively:

Components of assessment system	Target skills group
Standard examination Direct observation with ITE Simulation or standardized simulated patient	Patient care skills
Multi-source feedback Direct observation	Collaboration skills
Multi-source feedback Direct observation Audit and performance data	Healthcare professional attributes
Standard examination Direct observation Audit and performance data	Medical knowledge development and scholarly activity

Standard examination or standardized testing refers to the traditional format of written exams stemming from the legacy of the process-based education assessment. It has always been found as a valid and reliable tool in evaluation of acquisition of medical knowledge by learners, mainly foundational theoretical knowledge. In fact, despite the inclusion of standard examinations in only two of the most relevant skill groups in the table, every aspect of competency can make use of a form of standardized testing through written or oral exams in the assessment of knowledge regarding that group of competencies. For example, a written standard examination can be used in the assessment of theoretical knowledge of the preparation and steps needed in a procedural skill, knowledge of the application of physiopathological knowledge to a standard presentation, knowledge of tools of communication, knowledge of institutional circuit and policies, knowledge of aspects of patient safety and their place in the professional profile. All of this coupled with the fact that standard examination is common practice already on a local level makes it also particularly feasible and acceptable granted it adopts some adjustments regarding diversifying the types of tested knowledge.

Direct observation coupled with ITEs or In Training Examination targeting patient care skills, is aimed mainly at assessing clinical skills of evaluation and decision making in interactions with patients as well as the evaluation of proficiency in procedural skills. Lead by supervising professors and to much lesser extent trusted senior resident perceived to have

achieved proficiency, direct observation allows a look into the everyday clinical practice habits of residents and comes with a satisfying background of validity and reliability. However, direct observation as would be the case in all the other skill groups does come with a requisite of availability of observers be that professors or senior residents which can strain the feasibility of the method. Also, another issue with direct observation decidedly more relevant in other skill group is what is known as the Hawthorne effect in which the performance habits are altered by the act of observation.

However, this effect in the context of proficiency in procedural skills or making proper diagnosis is rather irrelevant as one cannot fake mastery and fluidity of a clinical procedure as well as they cannot fake clinical reasoning, for patient care skills those are more a question of whether you do know and have it mastered or not. Conversely if the act of observation creates some sort of performance anxiety in the one being observed which downplays his mastery level, it can be remedied through the input of the associated ITEs or a slightly distanced rerun of the observed procedure or evaluation.

Simulation is generally the mirroring of real-life clinical presentations or procedural settings, in which the learner usually is presented with a variety of single task maquettes or programmed full body patient simulator to inset them into a practical learning process that doesn't compromise patient safety. However, Simulation in patient care skills assessment in the frame of the proposed multi-tool assessment system comes with a few purpose distinctions from regular simulation.

First, it is important to note that in assessment, perhaps the best way to evaluate proficiency in patient care skills is a direct observation of those skills in vivo in the frame of a real-time interaction with patients. Such observation however does admit instances, where the situation is simply incompatible with observation such as during critical or life endangering events, and objectively advanced procedures for the learner's phase, as it comes at the price of patient safety. Simulation based assessment is proposed as a remedy of such limitations

especially in procedural skills, whether they are used to prepare the resident for a procedure through a formative form of assessment or simply used in a summative sense. Several formative assessments through simulations are particularly useful especially if used in the frame of larger structure of a programmatic assessment or a portfolio, because they allow a significant window and degree of freedom for examinees to make life-threatening errors without hurting a real patient, in order to provide a personalized in-depth description of the deficiencies found in the learner and whenever possible, personalized methods to remedy them.

Simulations have shown substantial validity and reliability especially in multi-task simulations affixed with real life conditions.

Feasibility in simulations is always dependent on two factors: first is cost, as the more intricate maquettes and mannequins that effectively mirror more challenging clinical presentations and procedures, are more relevant to the training and assessment of Critical Care and Anesthesiology residents. Where an airway management simulation for example, can content with a standard airway manikin in basic training or general medical education, Critical Care and Anesthesiology resident need access to manikins with the range to cover difficult airway management in an array of various clinical presentation. Evidently the second would be expected to strain the cost more.

The second factor is the preferable presence of simulation centers within faculty, that provides expertise on the use of the simulation methods and materials to both the assessors and the assessed. This factor in feasibility is thankfully in favor of simulations in our context as our faculty have pioneered simulation-based learning and has seen the launch of the FMPM simulation center back in 2014, followed by implementation of initial simulation-based training for residents in 2017 across several medical specialties including Critical Care and Anesthesiology, with several activities such as management of peri operative cardiac arrest in anesthesiology and a comprehensive training program on the diagnosis, isolation and

management of Covid-19 patients and particularly critically ill Covid-19 patients in the frame of emergency medicine and critical care. (81)

The two factors of feasibility have reached some ground especially on the local level, however cementing them would require amending some of the weaknesses as announced by the local simulation centers. Such weaknesses are also mended by supplementing it with standardized simulated patients, an objective structured clinical examination or OSCE tool where a supervising healthcare personnel portrays a patient in anesthesia consultation or other activities mostly relating to patient evaluation and demonstration of clinical reasoning.

Using this tool in lieu of standard or computerized simulation is very compatible as they both serve the "Shows How" level of the Miller pyramid and can even be cheaper while enjoying satisfying validity and reliability.

Direct observation applied in collaboration skills is a tool meant to make real time evaluation of residents' mastery of skills and attributes required for effective collaboration within the healthcare team and the healthcare institution. Observing and reviewing would be done on communication methods, integrating teamwork and even leadership in a variety of the settings that require it, by supervising professors. Such observation is preferably operated incognito as to try and minimize as much as possible the mentioned Hawthorne effect present particularly in skills that are behavior related.

Multi-source feedbacks are proposed in complementarity of direct observation, serving to provide an insight on how well collaboration skills and effectiveness are perceived by colleagues and other members of the healthcare team like nurses or anesthetists. Such feedbacks are preferably received from members with a certain level of seniority in the institution such as a head nurse or a senior resident. Interpretations of those feedbacks to gauge level of performance by professors must also be done through the lens of consideration of possible interpersonal conflict with the assessed resident and their weight in assessment varies as bad

feedbacks can stem from an act of undermining, faulty communication or a dreaded lack of competency in collaboration skills by the resident.

Multi-source feedbacks can also be seen as a complementary use of the drafted set of milestones regarding feedback and enjoy proper validity and reliability as a tool.

Direct observation applied in Healthcare professional attributes is a meant to make real time evaluation of residents' adherence to professional commitments required in practice especially commitments related patient safety and ethical consideration in costs of healthcare as per the components of the competency referred to in our framework.

Much similar to direct observation in collaboration skills, observation operated incognito by supervising professors is preferable as a high incursion of the Hawthorne effect is to be expected in many of the observation, perhaps to even bigger extent in professionalism assessment making it perhaps the hardest competency to gauge in the CBME construct.

Therefore, two supplementing tools were deemed necessary to further the evaluation of these attributes so they would reflect a profile more relevant to reality:

Multi-source feedback applied in evaluating professional HealthCare attributes, operated in a similar pattern to collaboration skills and with overall the same considerations on interpretations of the data obtained from those feedbacks.

Audit and performance data applied Healthcare professional attributes is chiefly proposed as a tool to assess commitment to patient safety, where supervising bodies would go through the activity of a resident on a designated period of time, reviewing department and patient logs to tally the number of events threatening patient safety, suspect deaths, professional errors, undesirable events and patient complaints as well as complaints from other departments within the institution. High recurrence of association of a particular resident with such events, especially when collected data seems to converge on the same aspect of practice or the same incentive of complaints is a tool of satisfying validity and reliability and in complementarity with

the others, can be used to spot the existence of a pattern that denounces deficiency in competency components regarding Healthcare professional attributes.

Direct observation coupled with ITEs applied to Medical knowledge development and scholarly activity, proposed in complementarity to standard examination of medical knowledge, where the in-training questioning pertains to applications of physiopathology and pharmacology in various aspects of practice, preferably distanced from critical events and unbound by the limits of the clinical presentations of a particular patient, differently to ITEs in patient care. In fact, ITEs in medical knowledge are often adjoined with ITEs on patient care by supervising professors in an attempt to broaden the comprehension of the learner and paint a bigger picture of inter-connected elements of clinical data and treatments.

Audit and performance data applied to Medical knowledge development and scholarly activity is a tool proposed to target the scholarly activity of that skill group. It can even be said it is perhaps the only and most compatible tool of assessing such an activity in the learner as it is the main one where the range doesn't contradict validity and reliability of the tool. This tool aims at providing performance data on initially the amount of reviewed works in literature proceeding to active involvement in studies and researches in and out of the department and institution and whether it develops into published and defended works.

Scholarly activity is often overshadowed by the pressure of the day to day practice and the overwhelming amount of knowledge faced by the Critical Care and Anesthesiology resident and therefore often relegated to a lesser importance. Therefore, naming it as an element of assessment and assigning it its own tool for consideration helps highlight its importance as one the main drivers of improvement of practices and efficiency.

These several tools are preferably grouped in a bigger framework of assessment such as a dossier portfolio, meant as a record and witness to competency achievements as well as their level of proficiency, built while drawing parallels with the competency phases made of the milestones of training. This portfolio in the modern sense would preferably be digital, whenever

that is feasible, as it eases access to both assessed learner and their assessors. This portfolio needs also to abide the characteristics of being comprehensive and would allow recording of self-assessments while making the proper distinctions, and most importantly incite a more formative form of assessment where progress can be tracked for each resident, allowing identification of acquisition weaknesses and developing a plan to mend them.

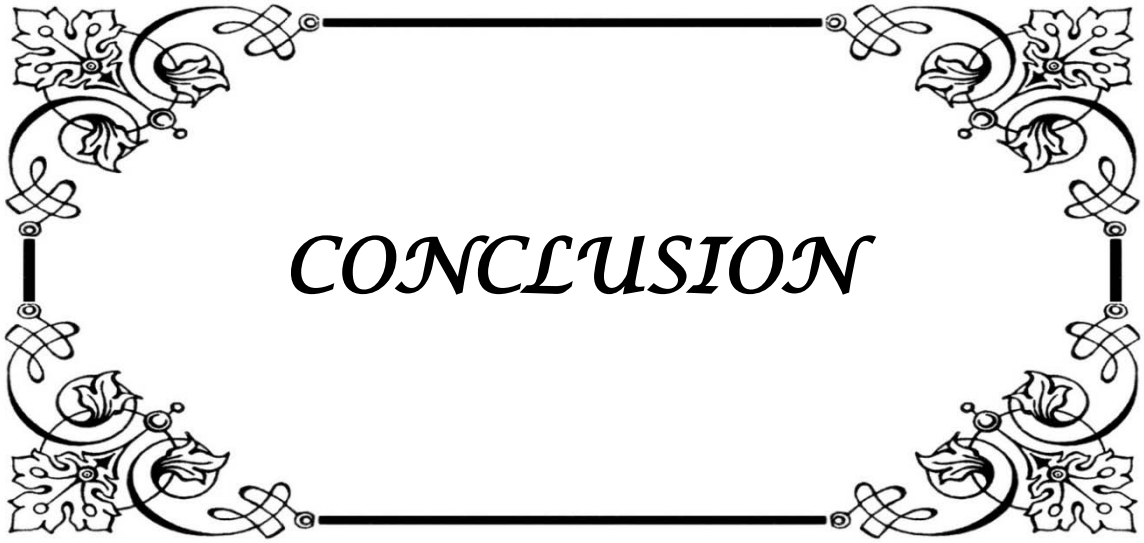
Evidently, reviewing these bigger frames of assessment is ideally done by a board of professors that constitute locally, the directing body of the specialty. North American recommendation refer often in this to clinical competency committees which are a necessary part of their new accreditation system that serves the function of synthesizing quantitative and qualitative assessments regarding individual resident/fellow performance based on a combination of assessment tools in the frame of competency models such as the milestones that define what resident/fellow performance should look like. And while implementing small versions of clinical competency committees on a small departmental scale such as done in the mentioned EPA based competency endeavor in the endocrinology department, legislating and implementing such a structure on a bigger faculty scale level can be quite challenging in the current setting and should it weigh negatively on feasibility, it must be replaced by a more simple structure such as a board of faculty professors of the specialty to carry out the assessment of profiles or discuss them in interdepartmental specialty staff meetings.

Structuring a frame of assessment isn't limited to the portfolio design as it can replaced due to issues of feasibility to other form of frames, like that of programmatic assessment as long as it enjoys the same range and comprehensive nature and is preferably in line with the mentioned criteria for good assessment systems outlined by Norci et al. 2018 (80).

Admittedly, throughout our description, assessments do lean heavily on professors as the pillar of the methods and systems of assessment. This is mainly due to the fact that they are the most able and well positioned to render judgement in both formative and summative settings.

And whether its assessment in a process-based or competency-based model, their heavy involvement is a mandatory if the assessment will hope to satisfy any of its social responsibility.

For CBME assessment in our context, professors also hopefully present the most reliable route to implementation, as aforementioned, of any change in the educational approach or model as they constitute the scientific community in faculty that would be referenced in any eventual decision-making process.



CONCLUSION

The development of dual process framework outlining proficiency in the frame of CBME, for Critical Care and Anesthesiology doctors, is an endeavor betting on the vital role of educational reform in the efforts of enhancing qualifications and quality of care in the specialty in Morocco.

Our framework was built adhering a comprehensive structure allowing, flexibility through our four skill groups and a re-iterated commitment to complementarity with current educational approaches serving to enhance their outcomes.

We would like to perceive implementation of our framework to be realistic and feasible but most importantly, invite future revisions and updates by specialty boards and actors to ensure its viability and continued relevance.

Designing this approach aims at transcending its basic objectives towards sparking further and wider interest in CBME and educational reform and will hopefully be regarded as an early step towards CBME is years to come. For this we have tried to bring together several lines of development of the competency debate, unfortunately omitting aspects some experts may find important and highlighting some others may find irrelevant. Nevertheless, we hope we were able to provide an overview that is helpful enough to stimulate future research endeavors.

ABSTRACT

Abstract

Competency based medical education has been at the center of the shifting educational paradigm around the world towards an evolved outcome-based education designed to enhance the quality of medical practitioners. Commitment to the outcome of competency has been a bandwagon of development that transpired into a multitude of educational frameworks since the beginning of the millennium. Jumping on the bandwagon of competency and framework design seems to be increasingly essential and demonstrates our continuous commitment to the improvement of education and training for medical doctors generally and Critical Care and Anesthesiology specifically.

For that end, this works seeks to sample a historical continuum of the paradigm shift to competency based medical education, specifying benchmarks from the Flexnerian process-based education to the modern-day development of educational frameworks, as well as explore the local status of the competency approach, through a substantial review of literature and data collection. This review has also served to explore the definition of competency and establish an operational definition of competency and proficiency. All culminating in the design of a dual process framework outlining proficiency in Critical Care and Anesthesiology. This framework is built conforming to a stable of basic skill groups and aims to foster a multi-dimensional, dynamic and contextual deployment of the concepts of competency and proficiency. Hence, it admits two structures designed to be complementary in structure and in function: one is the milestones : a project management tool serving to map the training journey and outline competency expectations and benchmarks of acquisition, the other is the competency dictionary: a human resource management tool built on the milestones and intended to provide a competency profile aimed at maintaining proficiency post-graduation.

This framework is joined with an outlook on assessment and the place it has on the historical continuum of competency based medical education, affixed with context relevant propositions of assessment tools also conforming with the basic skill groups.

Competency-based medical education is the new educational paradigm hailed by many educators as the approach to drive education further, therefore, this framework was designed adhering to a commitment of flexibility and comprehensiveness meant not only to accommodate but invite future revisions and updates reflecting its vitality and continued relevance.

Résumé

L'approche par compétence a été au centre du changement du paradigme éducatif dans le monde entier vers un enseignement évolutif basé sur les résultats et conçu pour améliorer la qualité des professionnels de la santé. L'engagement en faveur de la compétence en tant que résultat éducatif était une vague de progrès qui s'est traduite par une multitude de Frameworks éducatifs depuis le début du millénaire. Rejoindre le mouvement de la compétence semble être de plus en plus essentiel et la conception de Frameworks démontre notre engagement continu envers l'amélioration de l'éducation et de la formation des médecins en général et des spécialistes en Anesthésie-Réanimation en particulier.

À cette fin, ce travail cherche à illustrer le continuum historique du changement de paradigme vers une éducation médicale basée sur les compétences, en spécifiant des points de référence depuis l'éducation basée sur le processus flexnérien jusqu'au développement moderne de frameworks éducatifs comme celui de l'ACGME et CanMEDS, ainsi qu'explorer le statut local de l'approche par compétence, par le biais d'une revue substantielle de la littérature et de la collecte de données. Cette étude a également permis d'explorer l'évolution de la définition de la compétence et d'établir une définition opérationnelle de la compétence et de la maîtrise. Le tout aboutissant à la conception d'un framework à processus dualisé décrivant les compétences en Anesthésie-Réanimation. Ce framework est construit conformément à un ensemble de groupes de compétences de base et vise à favoriser un déploiement multidimensionnel, dynamique et contextuel des concepts de compétence et de maîtrise. Il admet donc deux structures conçues pour être complémentaires en termes de structure et de fonction : d'une part, les jalons : un outil de gestion de projet servant à schématiser le parcours de formation et à définir les attentes en matière de compétences et les critères d'acquisition ; d'autre part, le dictionnaire des compétences : un outil de gestion des ressources humaines fondé sur les jalons et destiné à fournir un profil de compétences visant à maintenir les compétences après l'obtention du diplôme.

Ce framework est accompagné d'une perspective sur l'évaluation et la position qu'elle occupe dans le débat de l'approche par compétence, ainsi que des propositions d'outils d'évaluation adaptés au contexte et conformes aux groupes de compétences de base.

L'approche par compétence est le nouveau paradigme éducatif salué par de nombreux éducateurs comme l'approche capable de faire progresser l'enseignement médical. C'est pourquoi ce framework a été conçu en adhérant à un engagement de flexibilité et d'inclusivité, visant non seulement à accommoder mais aussi à inviter les futures révisions et actualisations reflétant sa vitalité et sa pertinence continue.

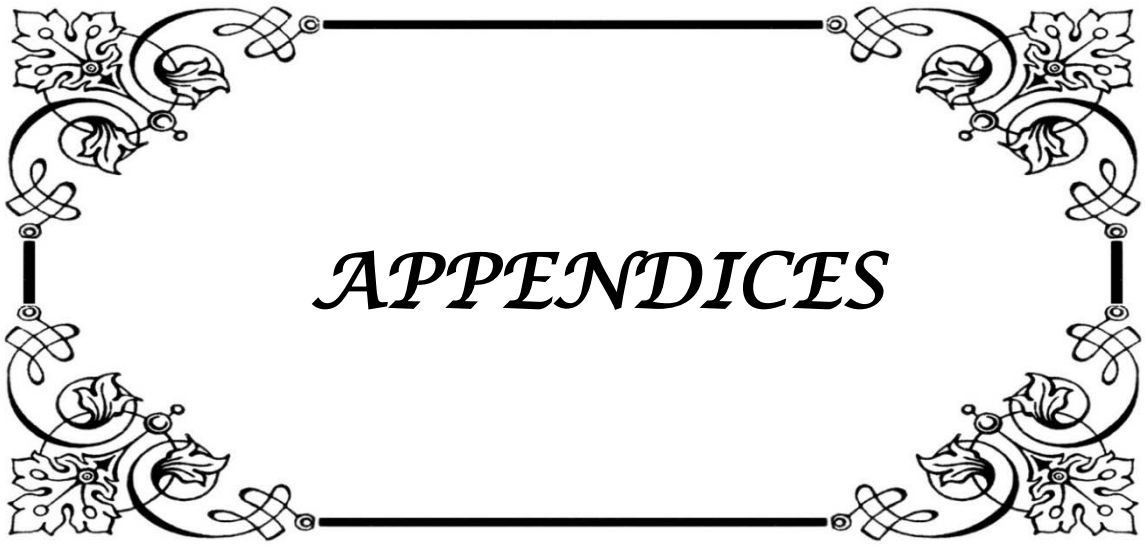
ملخص

لقد كان التعليم الطبي القائم على الكفاءة في قلب النموذج التعليمي المتغير في جميع أنحاء العالم نحو تعليم متطور قائم على النتائج مصمم لتحسين جودة الأطباء الممارسين. لقد كان الالتزام بنتائج الكفاءة بمثابة موجة من التقدم الذي أدى إلى ظهور العديد من الأطر التعليمية منذ مطلع الألفية. ويبدو أن الانضمام إلى حركة الكفاءة وتصميم الإطار أصبح أمرًا ضروريًا بشكل متزايد وينضوي تحت التزامنا المستمر بتحسين التعليم والتدريب للأطباء بشكل عام وأطباء الانعاش والتخدير على وجه التحديد.

لتحقيق هذه الغاية، يسعى هذا العمل إلى أخذ عينة من سلسلة تاريخية متواصلة من التحول النموذجي إلى التعليم الطبي القائم على الكفاءة، وتحديد المعايير من التعليم القائم على العملية الفليكسنرية إلى التطوير الحديث للأطر التعليمية، بالإضافة إلى استكشاف الوضعية المحلية للتعليم الطبي القائم على الكفاءة من خلال مراجعة جوهرية للأدبيات وجمع البيانات. وقد ساعدت هذه المراجعة أيضًا في اعتماد تعريف الكفاءة ووضع تعريف عملي للكفاءة والمهارة. ويتوج كل ذلك بتصميم إطار عمل مزدوج يحدد الكفاءة في الانعاش والتخدير. تم بناء هذا الإطار بما يتوافق مع مجموعة مستقرة من المهارات الأساسية ويهدف إلى تعزيز النشر الديناميكي والسياقي متعدد الأبعاد لمفاهيم الكفاءة والكفاءة. ومن ثم، فإنه يعترف ببنيتين مصممتين ليكونا متكاملتين في الهيكل والوظيفة: أحدهما هو المتطلبات أو الأعمال الازمة: أداة لإدارة المشروع تعمل على رسم خريطة رحلة التدريب وتحديد توقعات الكفاءة ومعايير الاكتساب، والآخر هو مرجع الكفاءة: أداة مستعملة في إدارة الموارد البشرية مبنية على الأعمال الازمة وتهدف إلى توفير ملف تعريف الكفاءة الذي يهدف إلى الحفاظ على الكفاءة بعد التخرج..

وقد تم الحاق هذا الإطار بنظرة عامة على التقييم والمكانة التي يحتلها في التدرج التاريخي للتعليم الطبي القائم على الكفاءة وبمقترحات لأدوات تقييم تتوافق أيضًا مع مجموعات المهارات الأساسية..

التعليم الطبي القائم على الكفاءة هو النموذج التعليمي الجديد الذي أشاد به العديد من مصممي البيداغوجيا باعتباره نهجًا لدفع التعليم إلى الأمام لذلك تم تصميم هذا الإطار مع الالتزام بالمرونة والشمولية ولا يهدف فقط إلى استيعاب المراجعات والتحديثات المستقبلية بل يدعوها إليها باعتبارها تعكس حيوية الإطار واستمراره.



APPENDICES

Patient Care 1: Patient Assessment and Development of a Care Plan

	Level 1	Level 2	Level 3	Level 4	Level 5
2016	With direct supervision, identifies disease processes and medical or surgical issues relevant to critical care; may need guidance in prioritizing clinical issues and their implications for critical care Requires direct supervision to formulate a plan of care that takes into account the most critical issues ~~Recognizes the need to solicit input into care plan from patients, family members, and surrogates~~	With direct supervision, identifies appropriate level of care (e.g., intensive care unit [ICU], transitional care unit) ~~Solicits input about patient preferences and goals of care from patients and family members~~ With indirect supervision, identifies disease processes and medical or surgical issues relevant to critical care May need guidance in identifying unusual clinical presentations and their implications for critical care With indirect supervision, prioritizes and formulates a plan of care that addresses critical issues	With conditional independence, identifies disease processes and medical or surgical issues relevant to critical care With conditional independence, identifies, prioritizes, and develops a plan to manage unusual clinical presentations With indirect supervision, identifies appropriate level of care (e.g., ICU, transitional care unit) Recognizes the need to solicit expertise from consulting services to optimize patient care ~~Incorporates patient and surrogate preferences into care plan when appropriate~~	~~With conditional independence, serves as a consultant in the management of a critically-ill patient~~ ~~Supervises other trainees in the development and implementation of a plan of care for the critically-ill patient~~ ~~With conditional independence, develops care plan in partnership with patients and family members when appropriate~~ Appropriately utilizes consulting services to optimize patient care With conditional independence, identifies, prioritizes, and develops a comprehensive plan for patients with unusual clinical presentations	Independently identifies, prioritizes, and develops a comprehensive plan that includes unusual clinical presentations Is sought out as a consultant in the management of critically-ill patients Utilizes consulting services cost-effectively to advance clinical care and personal expertise
2022	Efficiently gathers a focused history and physical examination to identify disease processes Formulates a differential diagnosis	Orders and interprets imaging and laboratory evaluation Formulates a care plan and communicates it to the team	Integrates data into a comprehensive patient assessment Develops and prioritizes a care plan	Continuously assesses the patient and recognizes unusual presentations Adapts care plan for complex clinical situations	Serves as a peer reference for unusual presentations Participates in the development of clinical pathways

Medical Knowledge 1: Pharmacology

	Level 1	Level 2	Level 3	Level 4	Level 5
2016	~~With direct supervision, demonstrates knowledge of the pharmacology, clinical indications, and application of medications used in the care of critically-ill patients, including vasoactive drugs, sedatives, analgesics, immunotherapy, and antibiotics~~	~~With indirect supervision, appropriately~~ utilizes consulting services to optimize pharmacologic management ~~With indirect supervision, applies the pharmacology, clinical indications, and selection of medications used in the care of critically-ill patients~~	~~With conditional independence, appropriately utilizes consulting services to optimize pharmacologic management~~ ~~With conditional independence, applies the pharmacology, clinical indications, and selection of medications used in the care of critically-ill patients~~	~~Independently applies understanding of pharmacology, clinical indications, and selection of medications (including medication interactions) used in the care of critically-ill patients~~	~~Serves as a consultant in pharmacotherapy for critically-ill patients~~
2022	Demonstrates knowledge of the pharmacology, clinical indications, and application of medications used in the care of critically ill patients, including vasoactive drugs, sedatives, analgesics, immunotherapy, and antibiotics	Applies knowledge of the pharmacology, clinical indications, and selection of medications used in the care of critically ill patients	Applies knowledge of the pharmacology, clinical indications, and selection of medications used in the care of complex critically ill patients	Integrates knowledge of pharmacology, clinical indications, and selection of medications (including medication interactions) to care for critically ill patients	Serves as a consultant in pharmacotherapy for critically ill patients

Réanimation

1. Évaluation des patients et développement des plans de soins
2. Gestion d'événements aigus et dysfonctions d'organes
3. Habilités procédurales pratiques et interprétations
4. Gestion respiratoire en unité de réanimation
5. Soins palliatifs et soins de fin de vie
6. Pharmacologie
7. Développement des connaissances médicales et activités d'érudition
8. Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins
9. Adoption d'une déontologie professionnelle
10. Économie de santé et coûts de soins
11. Éducation et encadrement des membres de l'équipe de soins
12. Feedback professionnel
13. Maintien du bien-être personnel
14. Communication avec patients, familles et proches aidants

Anesthésie

15. Évaluation pré-anesthésique
16. Planification de la prise en charge anesthésique et gestion de la douleur
17. Gestion du per-opératoire
18. Gestion des voies aériennes
19. Explorations échographiques d'urgence
20. Gestion du post-opératoire
21. Anesthésie régionale

Évaluation des patients et développement des plans de soins :

Trace un chemin vers l'autonomie des différentes étapes de la prise en charge

Souligne l'évolution souhaitée de l'évaluation initiale vers une évaluation complète associée à une indentification clinique de la présentation et son évolution

Souligne l'évolution souhaitée de la planification de la prise en charge d'un rôle effecteur vers un rôle de prise de décision et planification autono

Gestion d'événements aigus et dysfonctions d'organes :

Trace un chemin vers la gestion souhaitée des états de chocs, dysfonctions d'organes et autres urgences largement associées avec les soins de Réanimation Anesthésie

Souligne l'évolution souhaitée du repérage de la survenue des évènements aigus vers l'anticipation lorsque possible et la prise en charge de ces évènements

Habilités procédurales pratiques et interprétations

Trace un chemin vers l'autonomie de la préparation, l'installation et l'interprétation des différents moyens de monitorage

Souligne l'évolution souhaitée des procédures et moyens de monitorage de base vers d'autres, plus invasifs et plus compliqués à assurer ou à interpréter

Soins palliatifs et soins de fin de vie

Souligne l'évolution souhaitée vers une prise en charge palliative, largement et souvent associée à la prise en charge en milieu de réanimation et les différentes considérations et défis à faire face à une situation de fin de vie

Gestion respiratoire en unité de réanimation

Trace un chemin vers l'autonomie de l'évaluation des voies aériennes et la gestion des évènements respiratoires

Souligne l'évolution souhaitée de la gestion respiratoire de la prise en charge initiale vers une maitrise des différents moyens de ventilation

Évaluation des patients et développement des plans de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Réalise une évaluation clinique initiale ciblée Indique les examens paracliniques et les techniques d'imagerie initiaux et adéquats Nécessite un encadrement pour identifier un diagnostic initial en signalant les éléments physiopathologiques pertinents Nécessite un encadrement pour établir la priorité des patients selon la gravité clinique	Nécessite un encadrement pour identifier un diagnostic initial face des présentations cliniques atypiques Nécessite un encadrement pour élaborer un plan de prise charge initiale qui tient compte de la complexité, de l'incertitude et de l'ambiguïté inhérentes à la situation clinique du patient Sollicite des informations pertinentes aux soins auprès du patient, sa famille et ses proches aidants Reconnait le besoin de recourir aux expertises des autres spécialités pour optimiser la prise en charge	Établit avec autonomie relative, un diagnostic initial face à des présentations courantes atypiques Reconnaît les tableaux de défaillance d'organe et ajuste le plan de soins suivant Élabore et adapte un plan de prise en charge tenant compte du degré d'urgence clinique, de l'évolution et des comorbidités du patient pour établir un ordre de priorité des interventions Reconnaît, avec assistance, les signes indiquant que le moment est venu de délaisser l'approche d'acharnement thérapeutique et prendre les mesures qui s'imposent Sollicite des avis des autres spécialités pour optimiser la prise en charge	Évalue et identifie la présentation clinique et développe, avec autonomie, un plan de soins ainsi qu'un plan d'évaluation continue Adapte les soins au fil de l'évolution et guette les éléments qui indiquent l'imminence de futilité de soins Utilise d'une manière judicieuse les avis des autres spécialités ainsi que les ressources limitées au moment de crises	Sollicité dans un rôle de conseiller dans la prise en charge des patients de soins intensifs Développe des modèles d'évaluation et planification de prise en charge pratiques et adaptés aux ressources de l'institution Coordonne le recours aux services de consultations

Gestion d'événements aigus et dysfonctions d'organes

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît les évènements aigus, les états de chocs et les patients en détérioration (en USI ou en per-opératoire) Effectue la mise en condition initiale du patient selon la séquence ABCDE Reconnaît ses propres limites, et demande de l'aide au besoin	Évoque les diagnostics étiologiques et différentiels des événements aigus dans un ordre de probabilité Initie les efforts actifs de réanimation Effectue une évaluation continue du patient, concomitante à la prise en charge Initie la prise en charge étiologique, par une coopération per-critique avec les autres services pour des avis spécialisées	Se familiarise avec les présentations atypiques des états de chocs Gère avec autonomie relative, les évènements aigus, les états de chocs et les défaillances d'organe Démontre une conscience situationnelle et agit avec détermination pour maintenir un contrôle des situations de crise Reconnaît les circonstances où les efforts de réanimation ne sont plus efficaces et devraient être interrompus Recourt à l'encadrement pour guider la gestion des ressources limitées en situations de crise	Anticipe et gère avec autonomie les événements aigus et agit pour minimiser les conséquences d'une défaillance d'organe multi systémique Démontre une capacité de gestion face à un flux de patients critiques Décide et assume avec autonomie relative, la responsabilité d'allocation des ressources vitaux limitées à des patients jugés ayants plus de chances de survie	Sollicité dans un rôle de conseiller dans la gestion des patients critiques au niveau départemental et institutionnel Développe et défend des critères de priorités des patients adaptés aux ressources de l'institution

Soins palliatifs et soins de fin de vie

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Assure la préparation de la salle d'opération ou l'unité de réanimation (médicaments et les étiquettes de seringues...) puis installe et interprète les moyens de monitorage invasif de base pour l'intervention prévue (cathéters artériels et cathéters veineux centraux) Recourt à l'encadrement pour l'installation des moyens invasifs avancées de monitorage Interprète les résultats de gazométrie artérielle et décèle les déséquilibres physiologiques Peut nécessiter plus d'incitation à prioriser des interventions selon le degré d'urgence ou la possibilité de détérioration, évoquer la possibilité de dysfonctionnement de l'équipement de monitorage face à des données non justifiée	Assure la préparation et l'installation du patient en démontrant une orientation spatiale, une connaissance des étapes spécifiques, le regroupement du matériel nécessaire, des procédures d'hygiène et stérilité tout en tenant compte de l'urgence et des risques possibles Assure avec autonomie relative, la mise en jeu des moyens de monitorage invasifs avancés (techniques hémodilution, cathétérisation artère pulmonaire, ...) Recours à l'encadrement pour l'exécution des intervention avancées (drainage thoracique, cricothyroidotomie, bronchoscopie …) Interprète, avec assistance, les données de monitorage avancé et rapporte à l'encadrant	Indique le monitorage avancé selon les comorbidités du patient, les données de monitorage basique et l'intervention prévue Installe avec autonomie relative, des mesures de monitorage avancées en association aux efforts de réanimation et en interprète les données, en vue d'une adaptation du plan de prise en charge Exécute efficacement les étapes sous assistance, avec fluidité et économie des mouvements en évitant l'erreur de fixation Élimine la possibilité de dysfonctionnement de l'équipement face à des données non justifiées Manipule les paramètres, pendant une échographie ciblée, pour plus d'optimisation et reconnaît les résultats significatifs	Indique et Installe avec autonomie, des mesures de monitorage avancé et fournit une interprétation contextuelle des données Fait preuve d'une planification autonome de l'intervention en l'exécutant avec fluidité et économie des mouvements et en préservant les tissus mous Reconnaît les dysfonctionnements de l'équipement ainsi que des solutions de rechange provisoire visée à assurer la continuité de l'intervention Capable avec autonomie relative d'encadrer les autres pendant des interventions avancées Assiste à des formations en matière de méthodes de monitorage avancées	Assure le rôle de conseiller en matière de techniques de monitorage avancées Participe au développement des guides départementaux pratiques orientant le choix des techniques de monitorage, des protocoles d'interprétation et la gestion des données de monitorage Élabore des plans pour la mise à jour des techniques de monitorage Réussit des programmes de certification en monitorage avancé

Gestion respiratoire en unité de réanimation

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnait l'insuffisance respiratoire aigüe ainsi que ses diagnostics différentiels Nécessite l'encadrement pour développer un plan d'intervention adéquat Assure une évaluation initiale des voies respiratoires et la mise en œuvre initiale des techniques de ventilation de base (ventilations non invasives)	Évoque des étiologies plus complexes d'insuffisance respiratoire Nécessite l'encadrement pour évaluer la méthode de ventilation adéquate (invasive ou non invasive) et la mise en œuvre d'un plan de prise en charge initiale Établit le lien entre ses connaissances en physiologie et interactions cardio-pulmonaires et l'anticipation en temps réel des variations du travail respiratoire et des impacts sur les autres systèmes	Adapte, avec assistance, la méthode de ventilation en fonction de données pertinentes et de la complexité de la situation Pose, avec assistance, l'indication de trachéotomie, d'une oxygénation par membrane extracorporelle et autres méthodes avancées Avec assistance, anticipe et gère les variations du travail respiratoire et les impacts sur les autres systèmes	Évalue avec autonomie, la présentation de l'insuffisance respiratoire ainsi que ses implications systémiques et met en œuvre un plan de gestion adéquat Maitrise les méthodes de ventilation variées ainsi que les interventions éventuellement associées	Participe et dirige le développement pratique des procédures de la prise en charge respiratoire, des stratégies de ventilation ainsi que l'amélioration du matériel de ventilation

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît l'utilité de concevoir de plans soins palliatifs en accord avec les objectifs exprimés par le patient, sa famille ou ses proches aidants	Nécessite l'encadrement pour identifier le moment de passage au soins palliatifs Reconnaît la détresse émotionnelle que le passage aux soins palliatives génère Reconnaît les défis éthiques, moraux et culturels associés aux soins de fin de vie Nécessite l'encadrement pour choisir les moyens pharmacologiques et les interventions thérapeutiques nécessaire lors du passage aux soins palliatifs Reconnaît les critères qui permettent d'identifier les occasions de don d'organes	Nécessite l'encadrement pour établir et adapter les approches décisionnelles en fonction de la capacité décisionnelle du patient, des informations sur les croyances, les valeurs, les préférences, le contexte et les attentes du patient, sa famille, ses proches aidants, relatives aux soins qui lui sont prodigués Capable avec autonomie relative de choisir les moyens pharmacologiques et les interventions thérapeutiques nécessaire lors du passage aux soins palliatifs ainsi que juger la nécessité des ressources d'accompagnement et y faciliter l'accès	Établit et exécute et adapte des plans de soins palliatifs faisant preuve de la flexibilité nécessaire pour faire face aux fardeaux culturels et moraux ainsi que l'évolution de la complexité et de l'incertitude associées aux soins de fin de vie Capable de choisir avec autonomie les moyens pharmacologiques et les interventions thérapeutiques nécessaire lors du passage aux soins palliatifs Applique de manière autonome les directives concernant l'établissement du diagnostic de mort cérébrale Identifie les occasions de don d'organes, documente l'évaluation et la discussion relative au don d'organes et élabore des plans pour maintenir l'homéostasie du donneur	Sert de liaison entre les patients et les ressources institutionnels de soins palliatifs Participe à des comités de développement de guides stratégiques des soins palliatifs

Pharmacologie :

Schématise l'évolution souhaitée de connaissances pharmacologiques, primordiales à une pratique autonome et qualifiée en Réanimation-Anesthésie

Développement des connaissances médicales et activités d'érudition :

Trace un chemin vers une responsabilité d'érudition assurée par tout médecin réanimateur anesthésiste dans l'effort continu de pousser les frontières scientifiques de la pratique

Souligne l'évolution souhaitée d'une connaissance basique de la physiopathologie de base vers une exploitation autonome voir un enrichissement de ces connaissances

Pharmacologie

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre une connaissance de base en pharmacologie relative à l'anesthésie réanimation : drogues vasoactives, sédatives, hypnotiques, analgésiques, immunothérapies, antibiotiques	Reconnaît les applications pratiques des connaissances pharmacologiques mais nécessite un guide de choix de molécules Recours si nécessaire aux avis d'autres spécialités pour assister avec le choix adéquat	Capable avec autonomie relative d'appliquer ou d'ajuster l'approche pharmacologique adéquate Reconnaît les interactions médicamenteuses particulières et assure la gestion des effets indésirables	Maitrise la dimension pratique des connaissances pharmacologiques Développe des moyens pratiques pour exploiter les interactions médicamenteuses afin de réduire les effets indésirables	Sert de conseiller pour la prise en charge pharmaceutique des patientes d'anesthésie réanimation

Développement des connaissances médicales et activités d'érudition

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre des connaissances de base en physiopathologie et pharmacologie des affections de soins intensifs Consulte la littérature recommandée face à des difficultés spécifiques Participe aux conférences de spécialité et autres activités éducatives Établit des objectifs d'apprentissage du court et long terme	Démontre la capacité d'exploiter la compréhension du processus physiopathologique en pratique courante Développe une lecture critique de la littérature existante et comprend ses limites ainsi que l'intérêt des données probantes dans l'amélioration de la pratique Choisit des expériences d'apprentissage appropriées à explorer ses propres déficits Développe avec assistance un plan d'apprentissage qui vise le développement autonome de connaissances	Fait progresser ses connaissances médicales avec des activités d'érudition Participe à une activité d'érudition qui répond à une question de recherche ciblée dans le cadre de la spécialité Adopte une approche pratique fondée sur l'intégration de données probantes et l'expertise clinique Développe avec autonomie, son propre plan d'apprentissage autonome et continu	Initie des travaux d'érudition et participe au développement de protocoles fondés sur l'approche des preuves probantes visés à mieux rapprocher les connaissances médicales au pratiques cliniques et optimiser les soins Identifie les occasions d'apprentissage et d'amélioration en évaluant son rendement d'une manière réflexive à l'aide de données de sources diverses Exploite la lecture critique d'une revue de littérature pour choisir les méthodes appropriées afin de mieux répondre à une question de recherche	Assure la dissémination des connaissances en soins intensifs dans les conférences régionaux et locaux ou à travers des publications Participe à des activités d'érudition évaluées par les experts, communique leurs résultats et la valeur réelle de leurs intégrations dans un Protocole de soins Promeut les activités d'érudition et présente des guides pratiques pour faciliter leurs réalisations Promeut l'auto-évaluation et facilite la conception de plans d'apprentissage

Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins :

Trace un chemin vers une cohérence avec le système de santé

Souligne l'évolution souhaitée vers une position de direction au sein de l'équipe de soins

Souligne l'évolution souhaitée de la coordination efficace dans le cadre institutionnel ainsi que la collaboration avec les différentes ressources du système de santé

Adoption d'une déontologie professionnelle :

Trace un chemin vers l'acquisition d'un profil déontologique requis pour une pratique sécuritaire dans un domaine de soins bordés par plusieurs défis éthiques

Souligne une évolution souhaitée de déontologie professionnel de la phase de devoir vers un système de valeurs professionnelle primordiale pour renforcer la confiance publique en notre système de santé

Économie de santé et coûts de soins :

Souligne l'évolution souhaitée vers une considération efficace des couts de soins et leur considération dans la conception des plans de soins

Éducation et encadrement des membres de l'équipe de soins :

Trace un chemin vers un rôle actif dans la dissémination du savoir pratique vers l'équipe d soins dans l'effort continu de l'amélioration de la qualité prise en charge par l'élimination des lacunes

Collaboration dans le cadre d'un système de soins et transfert sécuritaire de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Communique les tâches aux autres membres de l'équipe de soins avec un langage clair en les adressant personnellement avec une manière d'identification appropriée Fait preuve du respect et fiabilité nécessaire pour réussir la communication et la collaboration avec l'équipe de soins ou en inter disciplinaire Recourt souvent l'encadrement pour une collaboration efficace Démontre une compréhension des procédures de coordination et transfert sécuritaire de soins et assure	Connaît les champs de pratique des professionnels du domaine de soins intensifs et fait appel à leur expertise pour concevoir des plans de soins cliniques lorsque les opinions ou les recommandations divergent Travaille efficacement avec le médecin de première ligne et interprète l'information clinique recueillie et les résultats d'examens paracliniques réalisés pour mieux orienter le diagnostic ainsi que le plan de soins Recourt à l'encadrement, pour une collaboration	Adopte une communication en boucle fermée Confie des tâches et dirige les membres de l'équipe pendant les efforts réanimation et supervise leurs réalisations Indique et organise avec autonomie relative, un transfert sécuritaire des soins, à la fois verbalement et par écrit, durant la transition d'un patient vers une nouvelle structure de soins, un nouveau professionnel de santé ou une nouvelle étape de prestation des soins	Démontre un rôle modèle de direction efficace de l'équipe de soins et de coordination interdisciplinaire Assure un rôle consistant de leader lors des situations complexes Intervient et assiste ses collègues juniors face à des résultats cliniques imprévus et communique de manière délicate lorsque la bonne gestion dépasse leurs acquis Décide avec autonomie, le niveau de soins et les moments opportuns pour les transitions de soins et	Développe des moyens de communication rapide pour optimiser le travail d'équipe ainsi que des méthodes de transition de soins qui assure et optimise les bénéfices de continuité de soins Conduit des débriefings suite à des événements critiques visant à discuter l'approche de soins et traiter les difficultés de communication Participe à la résolution des conflits et malentendus entre les membres de l'équipe de

leurs exécutions planifiées et indiquées par l'encadrement Assure la documentation exhaustive des problèmes pris en charge qui facilite le suivi et la continuité de soins (observation médicale, feuille d'anesthésie ….)	jugée efficace pendant les situations compliquées Planifie la logistique du transfert principalement en intra hospitalier y compris la stabilisation et les procédures préalables au transfert, les exigences en matière d'équipement et de personnel, les méthodes de surveillance et l'évaluation durant le transport	Collabore, avec autonomie relative avec les autres professionnels de la santé pour mettre en place une approche multidisciplinaire aux soins	collabore avec des autres professionnels de santé pour assurer la continuité des soins Collabore efficacement avec le circuit institutionnel impliqué dans la coordination du don d'organes	soins

Adoption d'une déontologie professionnelle

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Nécessite d'être incité à respecter l'engagement à l'égard de la sécurité des patients et de rapporter les évènements indésirables Satisfait l'obligation de déclaration des maladies transmissibles et les soupçons de violence familiale ou de maltraitance Fait preuve d'une attitude et présentation vestimentaire professionnelle et appropriée Assume les responsabilités confiées convenablement lors des situations de	Résume les particularités du patient et reconnaît les événements touchants à la sécurité en temps opportun Se voue à l'excellence de la pratique et réponds aux avis sollicités avec précision et ponctualité Avoue son inaptitude menant à l'exemption de certaines taches ou certaines responsabilités, à défaut de laquelle est revendiqué souvent un manque franc de professionnalisme	Met à profit son expertise médicale pour établir une relation cause-effet face à des erreurs humaines et des détériorations imprévues et repère les possibilités d'amélioration de la qualité des soins Adopte un comportement exemplaire lors des situations complexes faisant preuve de responsabilité envers les patients, la société et la profession Intervient lorsque des conflits interpersonnels ou des comportements envers des collègues ou des apprenants nuisent à un	Développe une prévision des événements indésirables face à des circonstances spécifiques et emploi des stratégies de prévention Signale les erreurs médicales conformément aux processus de l'établissement Gère les dilemmes éthiques soulevés en milieu clinique Participe aux programmes d'optimisation de compétences, de sécurité de soins et participe aux comités et activités départementales	Construit un recensement des compétences requises pour exercer en toute sécurité et de manière efficace, et encourage tous les membres de l'équipe à y conformer et à l'améliorer Lance des initiatives liées à la sécurité des patients et à l'amélioration de la qualité des soins et indique la nécessité d'ajuster certaines pratiques qui aggravent le débat éthique ou entravent la complétion efficace de taches, malgré leurs validations institutionnelles Participe à des comités

routine ainsi que la responsabilité à l'échec de leur complétion		environnement de respect Communique appropriement les inquiétudes entourant certaines structures du système et contribue à proposer des substituts	Satisfait aux normes de pratique professionnelle et agit comme modèle de rôle positif	nationaux de développement du profil professionnel à référencier

Économie de santé et coûts de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Nécessite souvent des incitations à considérer les coûts associés aux soins (médicaments, matériel, bilans...) Nécessite souvent une orientation pour reconnaître les moyens pour réduire les coûts des soins	Démontre une compréhension des principes généraux de l'économie de sante Commence avec orientation à établir la balance des coûts-bénéfices et son implication sur le plan de soins Nécessite l'encadrement pour assurer la gestion des ressources limitées fournies par l'institution	Démontre une conscience du fardeau des coûts de soins et intègre la balance coûts- bénéfices dans la formulation de plans de soins Favorise des options thérapeutiques dont les procédures de remboursement sont simples et équitables Capable avec autonomie relative, de gérer les ressources institutionnelles limitées selon l'ordre de priorité	Formule ou ajuste avec autonomie des plans de soins prenants compte de la balance coûts -bénéfices Participe régulièrement à des programmes visés à réduire les coûts tout en maintenant l'efficacité des soins	Développe des stratégies de coordination entre les ressources institutionnelles et personnelles du patient pour réduire les coûts de soins Sensibilise l'équipe de soins sur le risque d'un fardeau financier pour la poursuite des soins Participe à la restructuration des régimes d'assistance médicale (AMO…)

Éducation et encadrement des membres de l'équipe de soins

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît la valeur de partager les connaissances et le savoir-faire avec les autres membres de l'équipe de soins Assiste avec l'encadrement des étudiants en santé en expliquant les plans de soins	Explique le processus décisionnel et le plan de soins en résultant, avec encadrement Repère les besoins d'apprentissage et démontre la disponibilité nécessaire pour répondre aux interrogations des collègues juniors et autres membres de l'équipe de soins	Joint les descriptions du processus décisionnel et du plan de soins avec des commentaires explicatifs et des questions d'apprentissage qui tiennent compte de l'incertitude et des lacunes afin de renforcer le processus d'apprentissage Indique les comportements des apprenants à encourager ou à conserver ainsi que ceux à améliorer Coordonne avec autonomie relative des séances d'apprentissage au raisonnement clinique (ARC) en faveur des collègues juniors et étudiants en médecine	Évalue et reconnaît les lacunes spécifiques à un membre de l'équipe et encourage activement à remédier, en fournissant des suggestions précises pour l'amélioration et en attribuant des tâches et des responsabilités autour de la lacune en question Identifie les situations cliniques non sécuritaires mettant en cause les apprenants et met en œuvre les provisions nécessaires Participe à la préparation des présentations ou publications dans le but de disséminer l'information	Présente un modèle à suivre en matière d'éducation et encadrement en créant un milieu d'apprentissage stimulant Élabore les objectifs d'apprentissage afin d'optimiser les soins et mettre en œuvre un plan d'apprentissage adapté Présente ses apprenants avec des évaluations régulières et spécifiques et la rétroaction nécessaire pour améliorer l'apprentissage et le rendement

Feedback professionnel :

Schématise l'évolution souhaitée des feedback professionnels

Maintien du bien-être personnel :

Schématise l'évolution souhaitée de la gestion de la fatigue et des défis émotionnels, physique, mentaux et sociétaires imposés par la pratique de réanimation-anesthésie

Communication avec patients, familles et proches aidants :

Trace un chemin vers une communication efficace et autonome avec les patients pris en charge, leurs familles et proches aidants

Trace un chemin qui mène la communication de la phase de transmission basiques des données relatives à a prise en charge à une phase de gestion des difficultés de communication et des situations de conflits pour différents contextes culturels

Feedback professionnel

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Sollicite un feed-back constructif auprès des collègues et encadrant	Fournit des feedbacks constructifs aux collègues juniors et aux étudiants d'une façon respectueuse Sollicite et accepte le feedback des collègues et incorpore les suggestions dans l'approche pratique	Sollicite des feedbacks de sources et d'utilité variées (Membre de l'équipe de soins, patients...) Sollicite et fournit des feedbacks constructifs dans des situations délicates (résistance au feedback, résultats divergents possibles, feedback pour un praticien vétéran)	Fournit des feedbacks constructifs et spécifiques aux membres de l'équipe de soins visant à améliorer le processus d'auto-évaluation	Établit une corrélation entre les feedbacks et l'auto-évaluation pour améliorer l'approche pratique et optimiser les soins

Maintien du bien-être personnel

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre des connaissances de base en matière de gestion de fatigue accumulée et des conséquences d'un sommeil erratique Démontre une compréhension de l'utilité des principes du bien être associés à la responsabilité de maintenir un rendement professionnel	Établit la balance nécessaire à une meilleure coordination entre la vie personnelle et les responsabilités professionnelles Identifie les ressources départementales et institutionnelles fournies pour améliorer le bien-être personnel	Reconnaît les défis posés par des facteurs mentaux et physiques qui pèsent sur le bien-être ou le rendement du médecin dans des contextes cliniques stressants ou traumatiques, et applique des stratégies pour éviter les Burns-out Reporte ses soucis à propos du bien-être de ses collègues et leurs renforce avec des stratégies de gestion	Fait preuve d'une balance modèle, entre la vie personnelle et les responsabilités professionnelles Instruit ses collègues juniors au sujet de gestion émotionnelle et bien-être dans un effort pour atténuer l'impact de l'épuisement physique et émotionnel sur la sécurité des patients Repère des comportements inquiétants chez des membres de l'équipe témoignants d'un épuisement mental ou émotionnel négligé	Participe à des comités institutionnelles veillants sur le bien- être des professionnels de santé et le développement de règlement institutionnels l'assurant Participe aux procédures d'assistance des collègues en plein burn-out

Communication avec patients, familles et proches aidants

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Communique sous encadrement avec le patient, sa famille et ses proches aidants et transmet des informations au sujet de l'évolution médicale et du plan de prise en charge avec clarté et précision en faisant preuve de compassion et de respect Utilise un langage approprié et exempt de jargon médical pour assurer la compréhension et affirmer le consentement de la famille et des proches aidants Reconnaît les situations où la communication	Répond aux questions du patient, de sa famille et de ses proches aidants au sujet des prochaines étapes Identifie les situations de conflits familiales répercutant sur l'adhésion et la poursuite de soins Offrir l'assistance en respectant les limites du milieu socio-économique, du genre, de la religion et des croyances culturelles Exploite efficacement l'assistance des ressources fournies par l'institution (traducteur, psychiatre...) pour optimiser la communication	Gère avec autonomie relative les situations de conflits complexes nécessitant la communication avec des individus des milieux socio-économique, des genres, de religions et des croyances culturelles différents Reconnaît la responsabilité d'expliquer l'origine de résultats cliniques imprévus et divulgue les événements indésirables aux patients, sa famille et ses proches aidants	Gère avec autonomie les situations de conflits complexes nécessitant la communication avec des individus des milieux socio-économique, des genres, de religions et des croyances culturelles différents Adresse les patients qui perçoivent que le fardeau associé au traitement ou aux examens est plus grand que les bienfaits cliniques pouvant en découler Discuter de l'option du don d'organes et de tissus dans le cadre des discussions de fin de vie avec les proches du patient	Développe des modèles de communication inter culturelles Établit des relations de confiance thérapeutique avec les patients et leurs familles et leurs proches aidants, adéquates avec le rôle de conseiller Divulgue, au patients et leurs familles et proches aidants, les erreurs médicales influant le parcours des soins ainsi que les complications imprévues dans les normes définies par l'institution

nécessite l'intervention d'un autre individu ou l'assistance des ressources fournies par l'institution (traducteur, psychiatre...)	Documenter la rencontre clinique pour qu'elle reflète fidèlement la discussion et les décisions		Explique les résultats cliniques imprévus et divulgue les événements indésirables aux patients, sa famille et ses proches aidants	

Anesthésie

1. Évaluation pré-anesthésique :

Schématise l'évolution vers l'autonomie des consultations pré anesthésiques, l'anamnèse, les examens cliniques et paracliniques et le recueil de données

2. Planification de la prise en charge anesthésique et gestion de la douleur :

Schématise l'évolution vers l'autonomie de planification des interventions anesthésiques, gestion de douleurs et en fixe des objectifs à partir des données de l'évaluation

3. Gestion du per-opératoire :

Schématise l'évolution vers l'autonomie de la mise en œuvre des plans conçus, la surveillance et l'adaptation en peropératoire

4. Gestion des voies aériennes :

Schématise l'évolution vers la gestion des voies aériennes difficiles

5. Explorations échographiques d'urgence :

Schématise l'évolution vers l'autonomie des explorations échographiques d'urgence

6. Gestion du post-opératoire :

Schématise l'évolution vers l'autonomie de la gestion du réveil et les complications pouvant être y associées ainsi que le transfert de soins

7. Anesthésie régionale :

Schématise l'évolution vers l'autonomie de pratique sécuritaire de l'anesthésie régionale

Évaluation pré-anesthésique

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Conduit une anamnèse relative à l'intervention prévue accompagnée d'un examen clinique orienté et passe en revue les examens paracliniques réalisés puis synthétise, de façon organisée, les renseignements cliniques pour les présenter à un superviseur qui encadre l'interprétation et la prise de décision anesthésique Nécessite une orientation pour mieux cibler l'anamnèse Documente la consultation ainsi que le consentement et examine les dossiers précédents du patient	Réalise une évaluation clinique ciblée et complète la prescription des explorations paracliniques en accord avec les indications systématiques du département Nécessite une incitation à soulever les éléments indiquant une exploration plus approfondie Initie l'interprétation anesthésique et recours à l'encadrement pour prise de décisions	Réalise et interprète une évaluation clinique ciblée associée aux examens para cliniques appropriés Peut nécessiter plus d'incitation à prescrire des explorations inhabituelles en dehors des indications systématiques du département Mène avec autonomie relative le processus de préparation et de prise de décisions en tenant compte de l'urgence clinique de la situation et la disponibilité des ressources	Réalise et interprète, avec autonomie, une évaluation clinique ciblée en temps utile, pour l'éventail des situations cliniques en anesthésiologie Mène avec autonomie le processus de décision ainsi que l'indication d'explorations plus approfondies Soulève les comorbidités et les résultats de l'évaluation clinique et paraclinique prévoyant la survenue de complications d'anesthésie	Réalise une évaluation clinique ciblée et globale soulevant des problèmes de santé non diagnostiqués auparavant Présente une claire stratification de risques d'anesthésie résumant tous les éléments pertinents et leurs relations cause-effet avec les risques ou complications en question Participe au développement du Protocole de l'évaluation des patients en anesthésie

Planification de la prise en charge anesthésique et gestion de la douleur

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Reconnaît les divers éléments d'un plan de prise en charge anesthésique en spécifiant un ordre prioritaire d'exécution centré sur le patient Énumère les stratégies de gestion de la douleur adaptées aux ressources institutionnelles	Élabore un plan de prise en charge anesthésique centré sur le patient, englobant la surveillance peropératoire, le type de l'anesthésie, le recours aux produits sanguins, le suivi postopératoire ainsi qu'un plan de gestion de douleurs, tout en suivant les guides pratiques institutionnels Peut nécessiter plus d'incitation à planifier une marge pour l'adaptation aux événements imprévus et la gestion des risques associées à l'anesthésie Recours à l'encadrement pour gérer des patients avec des comorbidités importantes	Élabore, avec autonomie relative, un plan de prise en charge anesthésique assurant la marge sécuritaire devant des problèmes d'induction, du maintien, du réveil, et la gestion de la douleur Recours à l'encadrement pour gérer des patients avec des comorbidités importantes mal-contrôlées	Élabore, avec autonomie et face à des patients avec des comorbidités importantes et mal-contrôlées, un plan de prise en charge anesthésique, qui intègre tous les résultats de l'évaluation pour assurer la prévision et la gestion des problèmes liés à l'induction, au maintien et au réveil de l'anesthésie, et la gestion de la douleur. Fixe des cibles hémodynamiques précises et adaptées face à des instabilités hémodynamiques ou une cardiopathie importante	Développe des stratégies pour réduire les complications immédiates et tardives d'anesthésie Élabore des plans d'anesthésie face à des présentations prévoyant la résistance aux protocoles classiques d'anesthésie ou d'analgésies (Notion de toxicomanie, recours courants aux derniers paliers d'analgésie) Développe et adapte les guides pratiques en anesthésie en fonction des ressources fournies par l'institution et leurs disponibilités

Gestion du per-opératoire

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Assiste la mise en œuvre du plan anesthésique : l'induction, la maintenance et le réveil de l'anesthésie ainsi que la gestion de douleur associée Assiste la gestion d'une émergence ou autre évènements imprévus en peropératoire	Assure avec autonomie relative, la mise en œuvre d'un plan anesthésique conçu pour la gestion d'une intervention simple et face à des comorbidités minimes Démontre une succession d'étapes compatible avec l'ordre prioritaire d'exécution Assure la gestion d'évènements ou changements physiologiques peropératoires prévus avec recours minimal à l'encadrement ou collègues seniors	Assure avec autonomie relative, la mise en œuvre d'un plan anesthésique conçu pour la gestion d'un patient avec des comorbidités importantes Assure une surveillance optimale peropératoire visée à guetter les changements physiologiques et le diagnostic précoce des événements peropératoires imprévus mais pouvant solliciter l'encadrement ou collègues seniors pour les gérer Réussit une communication efficace des évènements imprévus avec le médecin opérateur et le reste de l'équipe en peropératoire	Assure avec autonomie, la mise en œuvre d'un plan anesthésique conçu pour la gestion d'un patient avec des comorbidités importantes multiples et mal contrôlées Assure avec autonomie, l'anticipation des évènements imprévus ainsi que l'adaptation efficace en peropératoires du plan anesthésique selon leurs impacts sur le déroulement opératoire et la récupération post opératoire Renseigne le médecin opérateur sur les données ou évènements pouvant influer la prise de décision en peropératoire	Assure la gestion des évènements rares ou inexplicables en peropératoires Développe des chemins pratiques à travers les altérations des données de surveillance menant à l'anticipation efficace des évènements imprévus ou à limiter leurs récurrences en peropératoires Conjecture et avise le médecin opérateur sur une association possible entre la récurrence des évènements indésirables et certaines pratiques en peropératoires

Gestion des voies aériennes

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Réalise une évaluation initiale des voies aériennes Effectue la ventilation par BAVU sur des voies aériennes régulières	Élabore un plan et prépare l'équipement et le matériel nécessaires pour la prise en charge des voies respiratoires. Reconnaît une ventilation non invasive insuffisante nécessitant l'intervention de collègues plus expérimentés. Reconnaît les critères d'une extubation sécuritaire	Reconnaît les patients chez qui la ventilation risque d'être difficile ainsi que les états pathologiques susceptibles de compliquer l'intubation et élabore avec autonomie relative un plan pour sa gestion Élabore, avec autonomie relative, un plan sécuritaire d'extubation avec des soins post-opératoires associées	Synthétise, à partir de l'anamnèse et des connaissances sur l'anatomie des voies respiratoires, si on envisage une intubation ou une ventilation au masque difficile et met en œuvre un plan de ventilation efficace avec autonomie	Assure le rôle de conseiller en matière de gestion des ventilations difficiles Développe des guides pratiques visant à diminuer les lésions occasionnées par les tentatives d'intubation répétées

Explorations échographiques d'urgenc

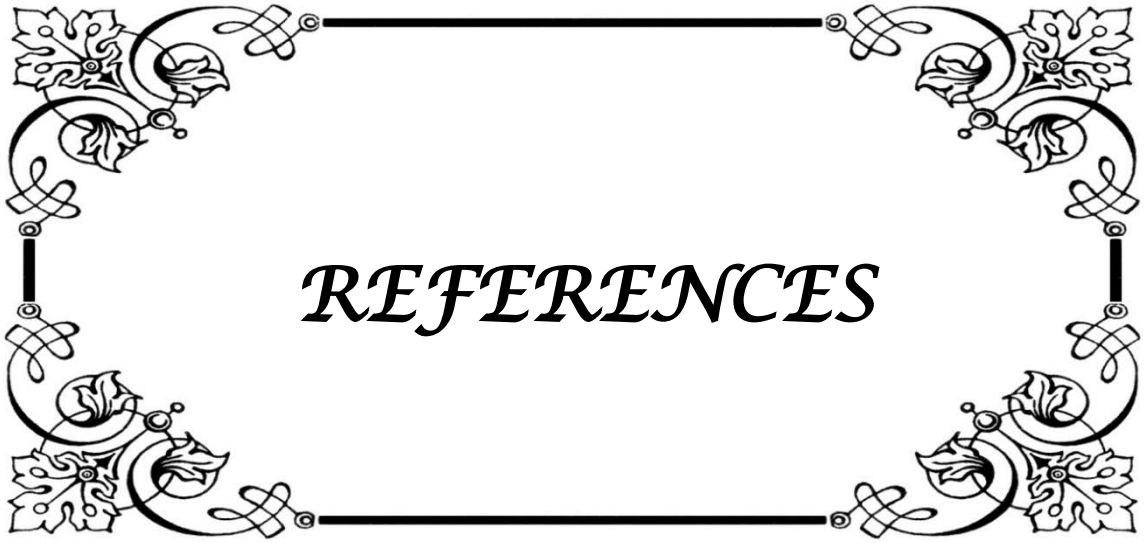
Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Démontre les connaissances cliniques et terminologiques de base, essentiels à l'exploration échographique d'urgence Démontre une bonne orientation anatomique lors des initiations à l'échographie d'urgence et assure la documentation des explorations réalisées Recourt à l'encadrement pour la prise d'abords vasculaires échoguidés	Installe avec autonomie relative le matériel et les réglages adéquats à l'exploration Obtient avec autonomie relative des images de qualité convenable et assure l'interprétation de présentations typiques des tableaux courants (exemple : hypovolémie, insuffisance ventriculaire et la tamponnade lors de l'échocardiographie Trans thoracique)	Distingue les structures anatomiques plus fines ainsi que les présentations plus particulières (exemple : épanchement minime, etc…) et signale avec autonomie la nécessite de la consultation auprès du service spécialisée Assure avec autonomie relative la prise d'abords vasculaires échoguidées en situations d'urgence	Choisit le matériel adéquat et Manipule avec autonomie les réglages afin d'optimiser la qualité d'image Assure avec autonomie l'exploration échographique d'urgence ainsi que les abords vasculaires échoguidées difficiles en situations de crises	Explore l'apport supplémentaire des nouvelles approches de l'échographie d'urgence ainsi que l'utilité de leur adoption sur le niveau institutionnel

Gestion du post-opératoire

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Contrôle le déplacement sécuritaire des patients vers la salle de réveil Contrôle le réveil de l'anesthésie et assiste la prise en charge des complications post opératoire immédiates ainsi que la gestion de douleur Assure le transfert en unité de réanimation ou la décharge des patients, si décidée, vers les services d'hospitalisation (ordonnances, niveau de soins, renseignements de soins…)	Assure le diagnostic et la prise en charge des complications post-opératoires communes, recours à l'encadrement pour la gestion de présentations atypiques et les retards d'émergence Démontre une compréhension d'options de décharge et indique le transfert en réanimation face aux présentations franches Assure (toutefois possible) un suivi post anesthésique tardif selon les ressources institutionnelles allouées	Assure avec autonomie relative, le diagnostic et la gestion des complications post-opératoires atypiques et les retards d'émergence Développe une conscience situationnelle des spécificités de l'intervention et des comorbidités associées, imposant le suivi en unité de réanimation ainsi que les spécificités de décharges qui en découlent	Assure le diagnostic et la gestion des complications post-opératoires tout en soulevant si l'étiologie découle plutôt de l'intervention que l'anesthésie Mène avec autonomie la prise de décision de décharge ou du transfert en unité de réanimation	Participe au développement d'un « Mapping » étiologique des complications post-opératoires visé à familiariser les présentations atypiques, leurs diagnostics et leurs gestions ainsi que la limitation des récurrences Participe au développement de critères spécifiques à la désignation du niveau de soins compatibles avec les ressources institutionnels

Anesthésie régionale

Phase 1	Phase 2	Phase 3	Phase 4	
Applique les connaissances sur l'anatomie aux techniques d'anesthésie régionale Démontre une préparation efficace à l'intervention (matériel, positionnement...) Identifie des complications potentielles de l'anesthésie régionale	Énumère les indications, les contre-indications absolues et relatives, et les risques du bloc nerveux périphérique Réalise un bloc nerveux périphérique tout en recourant à l'encadrement face à des difficultés imprévues ou un nombre de tentatives nuisible à la sécurité du patient Identifie les complications découlant de l'anesthésie régionale et recours à l'encadrement pour la prise en charge adéquate	Choisit, avec autonomie relative, la procédure d'anesthésie régionale la plus appropriée en tenant compte des lignes directrices locales du patient Réalise un bloc nerveux périphérique en un laps de temps raisonnable avec autonomie relative Identifie les complications découlant de l'anesthésie régionale et initie la prise en charge adéquate avec autonomie relative	Réalise, avec autonomie, un bloc nerveux périphérique issu d'un plan spécifique au patient tenant compte des facteurs de risque, du tableau clinique et du bilan de coagulation, dans un laps de temps raisonnable Identifie et prend en charge avec autonomie les complications découlant de l'anesthésie régionale Identifie les événements touchants la sécurité des patients et apporte les correctifs nécessaires à sa technique	Sert de conseiller en matière d'anesthésie régionale ainsi que la gestion des complications y associées Participe à l'amélioration des techniques d'anesthésie régionale pour des résultats plus optimisés Utilise les événements indésirables touchant la sécurité des patients résultants de pratiques itératifs au sein du département pour l'amélioration continue du Protocole institutionnel



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قسم الطبيب

أقْسِم بِالله العَظِيم

أن أراقبَ الله في مِهْنَتِي.

وأن أصُونَ حياة الإنسان في كآفّة أطوَارهَا في كل الظروف

والأحَوال باذلا وسْعِي في إنقاذها مِن الهَلاك ِوالمرَضِ

و الألَم والقَلَق.

وأن أحفَظَ لِلنَاسِ كرَامَتهُم، وأسْتر عَوْرَتهُم، و أكتمَ

سِرَّهُمْ.

وأن أكونَ عَلى الدوَام من وسائِل رحمة الله، باذلا رعايتي الطبية للقريب والبعيد،للصالح

والطالح، والصديق والعدو.

وأن أثابر على طلب العلم، وأسَخِّرَه لِنَفْعِ الإنْسَان لا لأذَاه.

وأن أُوَقّر َمَن عَلَّمَني،وأُعَلّمَ مَن يصغرني، وأكون أخا لِكُلّ زَميلٍ في المِهنَةِ الطِّبِّيَة مُتعَاونِينَ

عَلى البرِّ و التقوى.

وأن تكون حياتي مِصْدَاق إيماني في سِرّي وَعَلانيَتي ،نَقِيَّة مِمّا يشينها تجَاهَ

الله وَرَسُولِهِ وَالمؤمِنين.

والله على ما أقول شهيد

كليـــــــــة الـطـب
و الصيدلة - مراكش
FACULTÉ DE MÉDECINE
ET DE PHARMACIE - MARRAKECH
جامعة القاضي عياض
UNIVERSITÉ CADI AYYAD

سنة 2023 أطروحة رقم 237

تطوير إطار عمل مزدوج يحدد الكفاءة في الرعاية الحرجة والتخدير- تطوير إطار الكفاءات في التخدير والإنعاش

الأطروحة

قدمت و نوقشت علانية يوم 2023/12/21

من طرف

السيد محمد عزيز الفاهم

المزداد في 05 يناير 1998 بتونس

لنيل شهادة الدكتوراه في الطب

الكلمات الأساسية:

تعليم طبي قائم على الكفاءة - كفاءة - مهارة - إطار تعليمي
مهارات مطلوبة - مرجع الكفاءة - طرق التقييم

اللجنة

السيد	م. بوسكراوي أستاذ في طب الأطفال	الرئيس
السيد	أ. غ. الأديب أستاذ في طب التخدير والإنعاش	المشرف
السيد	س. يونس أستاذ في طب التخدير والإنعاش	الحكام
السيدة	ن. الأنصاري أستاذة في طب مراض الغدد و السكري	
السيد	ت. أبو الحسن أستاذ في طب التخدير والإنعاش	
السيد	م. المزواري أستاذ في علم الفطريات والطفيليات	