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Research Article

At the Core of Interprofessional Collaborative Practice. How Emergency Physicians are leading the Way during COVID 19 and into the New Norm -

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ABSTRACT

The practice of emergency medicine at the frontline of any healthcare institution enables Emergency Physicians to coordinate care across the whole continuum; with prehospital care providers, into the ED and downstream to the inpatient care areas and specialties. EPs are thus in very good position to coordinate and collaborate with these other care providers to plan the most suitable care options for each patient. They can be ambassadors of both Inter-Professional Education (IPE) and Inter-Professional Collaborative Practice (IPCP). Also in view that the practice of EM reflects society, EPs also have the potential to influence "The Triple Aim":

- To improve patients' experience of their care
- To improve the health of populations and
- To reduce and manage the per capita cost of healthcare

As such it is important for EPs to continue to strengthen their competencies, as outlined in the four broad domains of IPCP. From the leadership perspective, it is important to support IPE and IPCP, to ensure these areas flourish adequately and is mainstreamed across the institution. Eventually, the widespread practice of IPCP should be ingrained into the organization culture and become 'second nature' to all healthcare personnel.

Keywords: Inter-professional education; Inter-professional collaborative practice; Emergency medicine; Triple aim

INTRODUCTION

The practice of Emergency Medicine (EM) guides the front door of the hospital or institution. Emergency Physicians (EP) handle a variety of undifferentiated cases and diagnostic challenges, cutting across a spectrum of specialties and disciplines. These require timely management, accuracy in making diagnoses, execution of protocols or clinical pathways and apt decision making. Many of these require coordination and collaboration with prehospital care providers as well as other disciplines in the hospital. EPs are well positioned to spearhead, coordinate and even lead inter-professional care delivery and Inter-Professional Collaborative Practice (IPCP) teams. They are also very familiar with the concept of team-based care, practice and execution of emergency preparedness pathways, situational awareness and rapid thinking processes. Globally, EPs have the capabilities to push the envelope in a multi-faceted directions to ensure IPCP is implemented, flourish and is sustainable in their institutions. After all, EM is one of the specialty that is very closely linked to population health of a nation. It is the specialty reflective of societal challenges and consequences of public health policy decisions. The ED may have to deal with issues related to health and economic disparities, violence, social injustice, substance abuse and even pandemic preparation and response, as seen with the current COVID 19 situation [1-4].

IPCP occurs when multiple healthcare specialists from different professional backgrounds come together to manage patients and work with them, their families, caregivers and the community to deliver the best possible, wholesome quality care. These professionals, from diverse backgrounds, must be integrated into a cohesive unit to manage the patients, especially those with complex issues. It emphasizes on synchronous and coordinated care delivery. IPCP is different from 'multidisciplinary care', where each specialist provides his own inputs pertaining to the patient and his condition, and these need not be integrated across all the personnel providing care to the patient. Each specialist continue to be grounded in his own respective thinking and ideologies. The result can be very segmented or silo-ed care delivery, often leaving the patient confused or even having to pay more for the multiple consultations [4-6]. Berwick, et al. [7] in 2008 came up with the concept of The Triple Aim, which is described as a generalized, wholesome approach to:

- Improve patients' experience of their care
- Improve the health of populations and
- Reduce or manage the per capita cost of healthcare

The Triple Aim reinforces the need to harness and support IPCP adequately, especially in complex healthcare organizations [6,7]. It also corroborates domains of quality care, patient safety, good healthcare outcomes and KPIs (key performance indicators), and not forgetting the psychological safety and wellness of healthcare providers. IPCP is a topic which must be of interest to everyone along the healthcare provision chain: ministers, policymakers, the leadership of healthcare institutions, healthcare providers as well as patients, care-givers and society [7-9].

The following sections will share the various categories and examples of IPCP in play with some emphasis the COVID 19 pandemic, from the perspective of EM (Figure 1).

EMERGENCY PHYSICIANS, NURSES AND ED STAFF

The team of EPs, ED nurses and staff make up high performance management teams to take care of patients. During periods of upsurge, overload and crisis such as the recent COVID 19 pandemic, patient numbers were high, turn-over was rapid, decision-making had to be spot-on, with a lot of applications of fast-thinking. Technical management must abide by the Ministry of Health (MOH) and institutions' guidelines, closely adhering to agreed upon pathways, algorithms and work processes. Having proactive staff on the team is very helpful. An example of this would be, working with well-trained nurses who can anticipate the EPs' orders (but not over-ride). This becomes crucial in management of the ill, 'crashing' and complex patients, of which there were many, during the pandemic. Not only are the teams in the ED involved in stabilizing and managing their patients, they must also update and inform their families, either face to face or through phone calls or virtual means. They also need to appraise the inpatient teams about the patient, to ensure continuity of care provision. Hand-over checklists and "time-out" are also important to reduce errors at points of transition [3-5,10-12]

Essentially the ED IPCP teams must have a shared mental model and this is achieved by multiple training session, mindset management, proper closed loop communications and information sharing as well as timely and regular updates. Only then can we

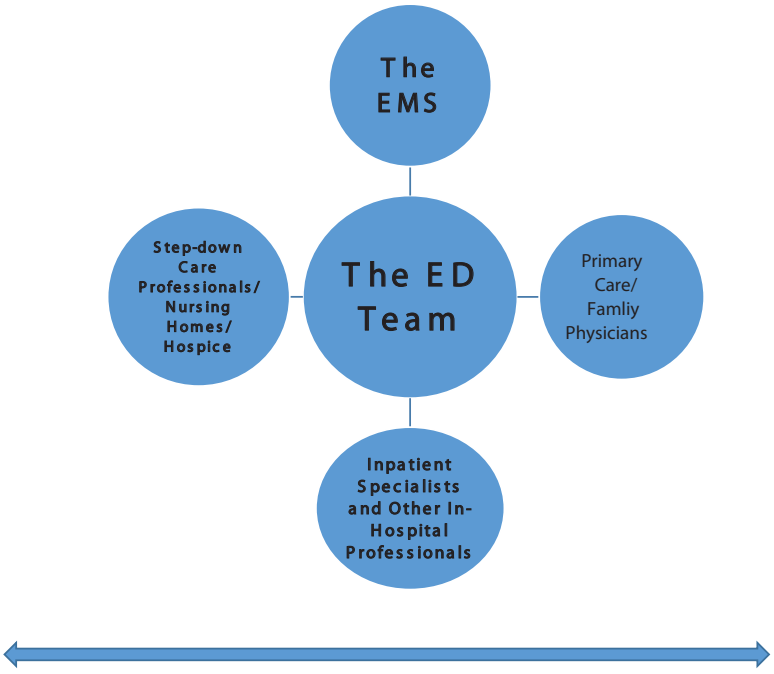

Figure 1: The central coordinating role of the ED Team in IPCP care planning and delivery.

develop a well ring-fenced system, that moves efficiently and produces the desired outcomes. In many EDs, inter-professional staff work in modular teams to reduce the inter-mixing of staff during the pandemic. This helps build strong bonds of relationships between team members. Even as the amount of work and work processes have increased during the COVID 19 pandemic, the positive and supportive environment of work is important. Besides caring for the patients, their families and caregivers, the ED staff must not overlook their own wellness and psychological safety. Post resuscitation, post-patient management or even post-shift, short huddles and debriefing for ventilation, sharing and ensuring each other's psychological wellness can make a difference [3,8,9,13].

When looking at the four domains of IPCP competencies, namely: [2]

- The values and ethics of inter-professional practice: to be able to work with personnel from other professions and maintain a climate of mutual respect, shared mental model and shared values.
- The roles and responsibilities: to understand your own role as well as that of other professions in order to adequately address the healthcare needs of patients.
- Inter-professional communications: to be able to communicate with patients, their families and the community in a responsible way in order to promote health and.
- Teamwork: to be able to build positive relationship and work with other professions to deliver patient-centred care and promote population health programmes which are effective and efficient.

It is obvious that the ED teams must possess and be able to execute these. The values may seem very generic, but when customized and practicalized to each individual setting, the outcomes can be multiplied.

THE ED TEAM AND THE EMS (EMERGENCY MEDICAL SERVICES) (FIGURE 1)

This represents another very important IPCP group. The paramedics initiate first line care to patients they transport in the prehospital settings. Examples of these may be management of cardiac arrest from the time they arrive on scene or starting management in the "platinum 10 minutes" in a trauma patient. During the COVID 19 pandemic, they have extra precautions with adornment of PPE (Personal Protective Equipment), ensuring the windows of the ambulance are wound down during transport as well as carrying out the stipulated 'wipe-down' of the whole ambulance, post transport. To ensure the continuity of care, the paramedics perform handover to the ED team, sharing information, mechanisms on injuries, social and environmental circumstances in which they picked the patient from as well as other relevant information that may help the team caring for the patient. The ED team then continue with what has been started and follow up from there. Our EPs are also familiar with the prehospital care protocols of the paramedics. This will help them align or continue care as needed. The paramedics are welcome to stay for a reasonable period to see how and what else is done for the patient they transported. If they have sufficient time, they can even stay for the debrief of the case management by the EP in charge. They are our partners-in-care and part of the IPCP team with the ED staff. Here, we can see where the IPCP values, understanding of roles/ responsibilities and communications are put into action [8,12,14].

THE ED TEAM AND INPATIENT SPECIALISTS (FIGURE 1)

Some of the patients presenting to the ED are managed in collaboration with inpatient specialists. In these cases, the latter would be activated to come down to the ED to work as an inter-professional team and manage the patient together with the ED Team [8,11]. In a multi-trauma patient at the ED at Singapore General Hospital, the

"trauma team" is activated. The specialists involved (from the ED, General Surgery, Orthopaedic Surgery, Radiology) would receive the activation simultaneously to come down and work with the ED team. After the initial assessment, if any other specialists (eg. Cardiothoracic Surgery, Neuro Surgery, Plastic Surgery, Burns, others) are required, they will be activated as well. For acute stroke cases, the "stroke team", comprising of the Neurology Registrar and the Neurology Advanced Practice Nurse will be activated to work with the ED team. For Obstetric and Neonatology emergencies, our "Neo-Obs Code" will be activated. Besides having specialized codes as these, individual on-call specialists may be activated to work with the ED team. With the COVID 19 pandemic, the Infectious Diseases doctor on duty is consulted often to discuss issues such as isolation beds, intensive care unit placement or swab results. Having algorithmic pathways, which have been agreed upon between bilateral or multi-lateral disciplines to follow for some of these patients, are also very useful. This is also reflective of the 'Systems-Based Practice' (SBP) in the institution. SBP one of the six domains residents in EM must be familiar in execution [8,15,16].

The workflow involved in these IPCP teams would also have gone through multiple training sessions and fine tuning. Usually this is done via in situ simulation, coupled with healthcare failure mode effect analysis, with all specialists involved giving their inputs to streamline processes. Any latent threats can also be ironed out during these practice sessions [17].

THE ED TEAM AND OTHER PROFESSIONALS (FIGURE 1)

In order to provide wholesome and impactful care for the ED patient, the ED team may need to liaise and work with other professionals such as the medical social workers (eg. for social issues, placement and housing matters, other domestic issues), allied health professionals (eg. radiographers, in the performance of appropriate radiology investigations or physiotherapists, for advice on walking aids) or counsellors and financial administration staff. The range of these professions can be quite extensive, especially in a large academic medical centre [14,18].

Once these professionals are consulted and brought in to assist with the management of the more adaptive range of problems encountered by each patient, all members of the team will discuss on the best options and disposition for the particular patient, the necessary follow up and course of action. In a larger healthcare organization or an academic medical centre, there will be more of such needs. This represents yet another IPCP team, which originate from the core, ie the ED team and EPs [19,20].

THE ED TEAM AND FAMILY PHYSICIANS (FP)/ PRIMARY CARE PHYSICIANS (FIGURE 1)

Here, there exist a bilateral relationship: the FP may refer patients to the ED team and the ED team may refer the patient back to the FP to be followed up accordingly. In either direction, adequate alignment, proper closed loop communications, shared values and mental model are the factors in play. This is very crucial because a breakdown in any of the steps, may result in undesirable outcomes for the patient. This is particularly important for patients such as the elderly and those with multiple medical problems. The continuity should not be broken [8,12,19].

THE ED TEAM AND STEP-DOWN CARE PROFESSIONALS (FIGURE 1)

With the ageing population across the world, the elderly patients continue to be a significant group of ED users. Once the ED team has made the necessary assessment and execute management, there may be proportion of these patients who can be sent to step-down care facilities, nursing homes, hospices and other facilities. Here is where the ED team will need to apply IPCP values in making arrangements, communicating and planning, together with the receiving personnel, the patient management strategies and care [20]. EPs must also coordinate and discuss with family members and care-givers on this decision to ensure adequate buy-in and understanding [21,22].

THE FOUR DOMAINS OF INTER-PROFESSIONAL COLLABORATIVE PRACTICE

When considering the four broad domains of IPCP competencies, how do we understand them from a practical point? What exactly are the competencies encompassed within each domain [2]? In the course of working as an EP, involved in IPCP work every shift, I like to approach this from the perspective of thinking of the characteristics (and descriptors) encompassed under each domain (Table 1). This way, it facilitates understanding of the requirements of IPCP when I have to train teams or conduct inter-professional team simulation practices. These words are more commonly used and easily understood. I also find them useful in explaining each of the domains and the required competencies/ sub-competencies [9,12,15,19].

EPs should be familiar with these competencies, especially with regards to their central role in coordinating IPCP care daily. What is practiced frequently, can become 'second nature' and this is exactly the critical initiation point for mainstreaming IPCP [4]. EPs can certainly lead the way.

ENSURING THE CULTURE OF IPCP PREVAILS

One of the most critical question on our minds would be how to ensure sustainability of the positive practices and good values/ competencies for the practice of exemplary IPCP. This is always a challenge. Thus, we have placed a strong emphasis on this and inculcated the following initiatives at Singapore General Hospital:

a. We conduct regular bilateral and multi-lateral dialogue sessions with the various departments to get inputs and feedback. In fact our senior EPs have been designated as representatives to lead discussions with the various departments. For example, there will be one EP and a senior resident in EM leading dialogues with the Department of General Surgery. (there will be other designated EPs for departments such as Internal Medicine, Cardiology, Orthopedics etc) The two persons leading this will coordinate and collate any issues which may arise in our workings with staff from General Surgery and schedule the meetings every 2-3 months. The issues may be related to certain behavior, communications problems, delays in responses, any inappropriate practices and others. This way, through regular meetings and dialogues, we maintain an open and cordial relationship with the other departments. This may seem like a small initiative but it helps us maintain good inter-professional practices through feedback and relationship building.

Table 1: IPCP domains and competencies.

Domains	Values/ Ethics	Roles/ Responsibilities	Communications	Team/ Teamwork
Competencies and Characteristics	· Friendly · Approachable · Flexibility · Kindness · Respect for team · Integrity · Commitment · Situational awareness · Trust · Collaborative · Maintain psychological safety of self and team · Supportive · Willingness to share · Maintain dignity of team and patient · Appreciate autonomy of patients · Promote equity of care · Awareness of work ethics · Sort through ethical dilemmas together	· Clearly defined roles, tasks and job description · Maintain competencies and skills of profession · Ability to cross –cover in certain circumstances · Simplify complex problems · Ability to discuss with team · Understand coordinated roles of team · Maintain confidentiality · Realize and be aware of any limitations · Ready to tap on complementary capabilities of team members	· Honest · Open communications · Correct choice of words · Succinct instructions · Closed-loop communications · Use common language understood by all · Sensitivity · Listening skills · Maintain neutrality · Ability to de-conflict as needed and finding common grounds	· Aware and appreciate presence of leaders and members · Team spirit · Team motivation and drive · Camaraderie · Team culture and team dynamics · Embedded learning from team · Collaboration to generate options · Adaptability · Common shared goals and mental model

b. EPs also coordinate regular insitu simulation with the other departments. Case scenarios are written together to address certain issues of concern, decided by the staff from the ED and the departments in question. This has helped us ironed out a variety of issues and competencies related to IPCP as well as handle latent threats which may have been overlooked. Some examples of the case scenarios would be: handling a peri-mortem caesarean section (with the Department of Obstetric and Gynecology and Neonatology), use of ECMO (extracorporeal Membrane Oxygenation) and ECMO-CPR (cardiopulmonary resuscitation) in a cardiac arrest patient (with the Departments of Cardio-Thoracic Surgery and Cardiology), a multi-trauma case (with colleagues from the Departments of Surgery, Orthopedic Surgery and others as relevant) [12,16]. In fact, there are multiple grant calls each year to support educational research under the theme of IPE and IPCP and these can be used for such training as well. The Academic Medical Centre (AMC) (SingHealth and Duke NUS) supports such initiatives and it is included in our Education Masterplan. This shows the support from the leadership in perpetuating IPE and IPCP throughout the institution.

c. Usually in most institutions, there are regular communications training for junior doctors and residents. At our AMC, there is also a focus on Communications Training for Senior Physicians. This is conducted in modular format using standardized patients and complex scenarios targeted to senior staff. In these training sessions principles of IPE and ICP are reinforced and reiterated.

d. In our AMC, each staff is appraised on a variety of factors for their performance appraisal. One domain is to get 360 ^{0} feedback**.** This is where colleagues from within the same department as well as from other departments can assess each staff. These feedback are taken seriously and if there are issues related to behavior, attitude, professionalism and others, they are explored by the staff with their supervisor/ mentor for deeper understanding. Practices like this helps to keep each staff conscious and aware of their behavior and performance.

e. Finally, there is an institution wide movement to enhance Psychological Safety (PS). An example of this would be the "Joy At Work" initiative. Every department will have their PS ambassador [9]. Thus, if any staff were to encounter issues related to IP work, behavior and need to voice these out, they can approach these representatives. The PS ambassadors are always on the lookout for positive demonstration of IPCP behavior to highlight and share as well as those that may need constructive feedback and improvement [9].

THE TRIPLE AIM

The introduction of the concept of the "Triple Aim" has certainly helped in putting IPE/ IPCP onto the agenda of governance bodies like the Ministry of Health or an equivalent regulating body/ organization in the various countries. This is because the 'Triple Aim' is closely linked to quality of care, healthcare deliverables, patient safety issues as well as the health of the population of a nation. The other important point in the Triple Aim is its focus on reducing per capita healthcare cost. It has also helped set the direction and focus for IPE and IPCP research [2,6,7].

Improving patients experience of care

With people living longer and increasing life expectancy, more are living with chronic illnesses to a ripe old age. However, this also means seniors and elderly are presenting more frequently to the EDs with complications, many of which are related to their chronic illnesses. They are facing more complex and multi-faceted problems, requiring management from various specialists. Consulting with one physician, who then makes the necessary referrals for the patient is not optimal. It is time-consuming, uncoordinated and can be confusing and challenging for patients, especially seniors. Today, as we deal with many time-dependent diagnoses and conditions; across a population that is more informed, knowledgeable and have higher expectations, one cannot run away from the need to provide good, basic interprofessional care to ensure quality, efficiency where

safety Key Performance Indicators (KPIs) are met. In the ED, we utilize many clinical care pathways and protocols for care execution. Here are also many levels of agreement, discussions and guidelines worked out with the various specialties on patient management for various conditions can run smoothly to provide time- and cost efficient care. Besides the above there have been many initiatives targeted at enhancing patients' experience from the perspective of the ED. Some examples include running discrete events simulation modelling to predict and visualize flows. The use of shared services such as laboratory and consolidating staffing have also been explored [23-25]. Various ways to enhanced capacity from the various services perspectives are also very helpful in looking at patients' experience. Our focus on the use of IT (information technology) and technology such as chatbots and virtual reality projections with the incorporation of AI (Artificial Intelligence) have also been used in collaboration with industry partners to see how flows and pathways can be improved [26]. IT and AI have also been used to help with manpower allocation and re-allocation to cover upsurge periods and thus reduce door-to-doctor consultation times. Much of these utilizes big data which have been collated over the years as well [23,27]. These are often carried out as pilots and research projects first, together with our colleagues from other departments (IPCP) to get their inputs as well. Following this, implementation will be shared with them, to ensure all staff are aware and we have the necessary buy-in.

Improving the health of population

Learning and working together will guide healthcare delivery and the desired outcomes. With the strategic thrust on IPE/ IPCP clearly defined, there will be adequate interprofessional inputs pertaining to health policies, governance framework and other health, management and screening guidelines. Setting of population health KPIs should also have interprofessional inputs. The collaboration can effectively and creatively optimize healthcare delivery and outcomes. The defined competencies can facilitate specialties working together and not putting one discipline over another. These principles are shared when teaching the future generation of healthcare staff to guide their curricular development. The Ministry of Health in Singapore have always used this inter-professional model in coming up with Clinical Practice Guidelines. Since its implementation in 2013 to date there have been hundreds of such guidelines to guide inter-professional practice and decision making on managing common problems and diagnoses groups [28].

The practice of Emergency Medicine reflects society. Thus, population health and EM are interdependent:

Population Health  Emergency Medicine

Parameters reflecting population health such as disease prevalence, disease burden, lifestyle diseases, level of urbanization and other health statistics affects the profile of patients and diseases presenting to the EDs. EPs have to be familiar with epidemiologic trends and statistics, in order to keep abreast of current healthcare needs of the population [6,7]. On the other hand, the way EM is practiced, the responsiveness towards time-dependent conditions, the efficiency of management of common diseases and the effective execution of clinical care pathways can impact population health. In the background of this scenario, there is always the looming issue of healthcare costs and cost effectiveness [3,4,6].

In the area of research on IPE/ IPCP, the Triple Aim helps focus on the themes of practical value. Quantitative research, qualitative research and thematic analysis studies can be applied to study these topics. Even better will be studies with creative and innovative IPCP interventions and longitudinal follow up, which can show "before" and "after" results.

Reducing the per capita cost of healthcare

The balance between providing good quality care and cost efficiency is always an issue countries have to grapple with. One of the fundamental ways to improve quality is to reduce the variation in the flow and process of providing a service. With IPCP, more clinical pathways and workflow processes are being put forth for common clinical problems and diagnoses. Interprofessional teams and specialists work on an agreeable and acceptable pathway for common clinical problems. This is also where there is a close link to values-based care. Having clinical pathways help to streamline care, investigations and management. This can help control cost to a certain extent, with some degree of standardization. An example would be the pathway to manage elderly with fracture of the neck of femur, which is a common problem seen in the ED. Here, EPs, nurses, orthopedic surgeons and physiotherapists work together in coming up with the pathway and are in alignment in terms of care provision, services needed, rehabilitation period, average length of stay and other factors [28-30]. This model has worked in Singapore which utilizes case-mix funding and reimbursements to hospitals are based on Diagnoses Related Groups [28]. With the various initiatives, Singapore has been able to maintain its health expenditure at about 4.5% of the GDP (gross domestic product) [31].

VIRTUAL AND REMOTE EXECUTION OF IPCP

COVID 19 provided the impetus for many technology-enhanced learning and virtual training to take centre-stage. IPE and IPCP training too had to go virtual. This involves the transmission of many images, voices and health data via telecommunications channel to provide consultation, advice and even education of the patients [3,32].

During the pandemic, many of the simulation-based training were converted to computer-based simulation as well. There is of course significant differences between this and the face-to-face training sessions. It is harder to discern nonverbal communications. The subtle nuances of conversations were also more difficult to pick up. Prebriefing took a longer time in order to ensure that all participants understood the instructions, in view many were doing it for the first time. However, given the pandemic, adaptation was necessary. Talking and giving instruction through the airwaves and via camera, using our microphones to communicate and even sharing views via the "chat" function became the new norm. Smaller scale in situ simulation were still conducted but with a limited number of participants [12,32].

Outside the training context, in real practice, teleconsultations became more commonly used. Teleconsultation inter-professional teams were able to provide inputs and sharing, virtually. It was difficult to get used to at first; not being in the same room as the patient and not being able to have the "touch and feel", but after multiple sessions, all parties became more used to this [33]. Even for virtual consultations, the staff would still have to type in their comments and inputs into the electronic health and medical records of the patients. This is important as there are medico-legal consequences and documentation is still a critical and important part of the consultation. Moreover, issues of maintenance of confidentiality, security of data and ethics of practice can pose some challenges. In SingHealth staff have to complete an online telemedicine and teleconsultation course

prior to delivery of such services. Technological and IT (information technology) support is also paramount. Finally, culture is another strong determinant of the acceptance of teleconsultation services. Some are more accepting, whilst other prefer the more traditional consultation methods [32,33].

CONCLUSION

The Emergency Department provides an excellent platform as the nidus to initiate and perpetuate inter- professional collaborative practice. This can be done both up-steam (with prehospital care providers) and downstream (eg. with inpatient specialists and step-down care providers). Emergency physicians have very strong potential to be good ambassadors of both IPE and IPCP. They can practice and execute all the competencies of the 4 domains of IPCP in the ED and also influence the health of the nation and healthcare costs, to a certain extent.

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