REPORT

Report on participation of the ICMR International Fellow (ICMR-IF) in Training/Research abroad.

1.**Name and designation of ICMR- IF**:

Dr Sandeep Sahu, Associate Professor, Department of Anaesthesiology and Emergency Medicine at Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, UP, India

2.**Address**:

Associate Professor, Department of Anaesthesiology and Emergency Medicine, Hno. Type 4/36, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, UP, India
Email: drsandeepsahu@yahoo.co.in
Mob: 8004904598, 9235563953

3.**Frontline area of research in which training/research was carried out**:

Trauma System, Trauma Management (including Trauma Resuscitation, Trauma Critical Care) and Accident and Injury Prevention

4.**Name & address of Professor and host institute** :

Dr Mayur Naryan
MD,MPH,MBA,FACS,FICS
Assistant Professor, Department of Surgery
Director, Center for Injury Prevention and Policy
Associate Director, Division of Medical Education
R Adams Cowley Shock Trauma Center
University of Maryland School of Medicine
Email:mnaryan@umm.edu

5.**Duration of fellowship**: 01/10/2015 to 31/12/2015 (Three months)

6.**Highlights of work conducted**:

i)Technique/expertise acquired :

During this fellowship of three months I had been rotated throw the various clinical and research departments of shock trauma center. I had seen the working of Trauma system and Emergency Medical System of the state of Maryland, USA. I had been supervised by the various faculty members of trauma center at Trauma Resuscitation Unit (TRU), Outpatient and Inpatient Department, Interventional Trauma Radiology, Trauma and Acute Care Operation theater, Intensive care Unit like Critical Care Resuscitation Unit, Multi-trauma Intermediate Care Unit, Multisystem trauma ICU, Neuro-Intensive care ICU and Surgical ICU, Lung Rescue Unit (Extra Corporeal Membrane Oxygen Unit) and Hyperbaric Medicine. Besides this I had also been rotated throw Department of Emergency Medicine of University of Maryland where I see the working and organization of Adult and pediatric emergencies unit.

Where I was exposed to principal of Trauma System including Prehospital Emergency Medical System, Trauma Resuscitation, Trauma Radiology, Trauma anaesthesiology, intrahospital and Interhospital trauma patient transfer, Trauma Critical care and rehabilitation. I had actively involved in learning of clinical policies and protocols of patient care, teaching and training program like conferences and seminars of resident's and fellows. I had also been sensitized to research and projects undergoing presently in trauma center.

I had actively learned the policy and principals of Injury Prevention at state of Maryland, USA. We had discussed the problem of trauma, accidents and emergency in India. We had analyzed the possible methods, solutions and planned a strategy that will be worked out to reduce the mortality and morbidity of Trauma patients with mutual collaborations. we had also work actively for the best possible trauma prevention program as per the need in India.

ii. Research results, including any papers, prepared/submitted for publication:

We had discussed and studies the existing trauma and emergency facility in India. The problems of Emergency and Trauma care in India have, the possible suggestion to improve the existing system in preview of USA system. the following points can be considered and imbibed for improvements:

Introduction:

Trauma care and Emergency Management, had been largely ignored and underestimated in India. there is a lack of exact data of the burden of injury in form of morbidity, disability and mortality. There are two major problems in the trauma-care in India: There is absence of networking between hospitals, medical college and trauma centers and lack of competent prehospital care (Emergency Medical system) in cities to each other in district, state and country level. Also there is no connection urban set-ups with the rural setup, where even basic trauma care is lacking.

India had major challenges in having effective trauma system that had pillars in form of injury prevention, prehospital care, effective comprehensive dedicated trauma care and rehabilitation as compare to rest of the world.

The lack of governmental investment in trauma prevention is the other vital component of this multi-factorial challenge. national policies that road safety was not a priority and not exist in India.

Risk Factors for increasing in number of trauma victims:

Social, cultural, and behavioral factors lead to a dangerous lifestyle that places the population at risk of trauma. That including falls (common in children and elderly), agricultural and occupational injuries, firearm injuries, poisonings, burns, drowning, suicide attempts, homicides, and natural and man-made catastrophes and disasters are also increasing day by day.

A. **Insufficient implementation of existing traffic rules:** India has national laws on the road safety and traffic rules. However, there is legislation at the state level, with insufficient enforcement of the laws in form of only small penalty or no prison. One can easily make driving license by so many means, if it gets cancelled. We recommend two warning with huge penalty after that hard long prison and never reissue of driving license strictly.

1. Absence of a vision on road planning: Traditionally, road safety was assumed to be the responsibility of the police and transportation sector. The potential value of "prevention" in road traffic accidents using a **safety-first approach** is needed. This is not only involving the vehicle drivers but also to pedestrians should follow it. The avoidance of high-risk activities like walking on road edges, instead of footpaths, letting children walk unassisted, rushing through moving traffic while in a hurry in crossing roads at non – zebra lines, listening to music while on the road and extension of shops and small stalls at both the side of main roads, unethical parking on the roads etc. This also hamper follow the proper traffic on roads of vehicle's and on accident ambulance not able to reach on time.

2.**Helmets**

In Indian most two-wheelers drivers (one-third) did not have a helmet and almost no passenger on two wheelers. Moreover, among those who had a helmet, not having good quality, were not wearing in the approved manner. We should enforce law all driver and passenger will have mandatory helmet on cycle and two wheelers.

3.Seat belts and child restraints

Overall, vehicle safety belt use reduces RTI morbidity and mortality by approximately 50%. So there should be must seat belt on front and back seat with consistent use of child restraints and belts.

4.Speed limits

Vehicle speed is related in a dose-response fashion to RTIs; the faster the

vehicle, the greater the injury. There should be proper sign mentioning the speed limit and should be monitored with camera strictly. There should be red stop sigh with breaker at places to avoid over speed.

5. **Alcohol (stop Drink-Driving)**

Alcohol impairs decision making, resulting in the inability to perceive hazardous circumstances. Alcohol also influences diagnosis, management and recovery from traumatic brain injuries (TBIs), including prognosis. Blood alcohol concentration of 0.05 g/dl produces 1.83 times greater risk of traffic collision than zero level so it should be fixed the lower acceptable limit and be checked.

6. Child restraints: It should be must the child in car have the restraints. USA has laws mandating protection for children in cars.

USA Child Restraint Requirements:

Age/Weight/Height	**Appropriate Restraint**
Birth to at least age 1 (or 20 pounds)	infant only/rear-facing or convertible seat rear-facing
Age 1 (or at least 20 pounds) to age 4 (or under 40 pounds)	convertible seat forward facing or forward facing seat, or booster seat if applicable
Age 4 to 8 (or less than 4' 9" or under 65 pounds)	booster seat
Age 8 (or more than 4' 9") to age 16	shoulder/lap seat belt

Recommendation: All children under the age of 13 should ride in the back seat for safety. Never place a rear-facing car seat in the front seat with an active air bag.

B. Prehospital trauma care:

Prehospital trauma management fundamentally relies on standardized protocols that are highly time-sensitive algorithms. Mechanism of injury, associated vehicle/property damage, scene safety for rescuers and extent of difficulty in extrication are crucial determinants of the outcome of a traumatic event. Correct immobilization of the spine and urgent transport of critically injured patients with attempts to start the stabilization process of the patient en-route are keys to prehospital trauma care. Emergency medical services (EMS) are either not

existing or new or at nascent stage in India even in the metropolitan cities. Ambulances from both the public and private sectors are not well equipped or staffed by well-trained personnel capable of managing prehospital care. There is an absence of a well-designed first responder's system with responsibly not clearly defined between different public and private stakeholders.

Medical science has gifted us with the knowledge and competency to save lives even after grave injury. But the injured actually have to make it to the hospital to receive this care. The EMS at the injury site before reaching the hospital improves the survival rates and outcomes. Researchers have concluded that up to one-third of fatalities due to RTI can be avoided by implementation of a comprehensive trauma system, by providing interventions focusing on life-threatening injuries. The methods of Airway Breathing Circulation (A, B and C) care and recognition of hemodynamic instability should be the aim of initial resuscitation.

The reality of the situation is that people tend to be apathetic or play a scoop-and-run approach utilizing the vehicle at hands breadth to reach the nearest health facility. the issue in India remains the sheer lack of formal training to citizens and traffic police on handling the victims of trauma - which most cases can worsen the extent of primarily injuries. To compound the delay, all the injury victims have to be registered as a *police case* before or during management and in the absence of rights and responsibilities of bystanders and health personnel, often the *victims of injury* are entangled as the *victims of situation* leading to a delay in prehospital and hospital trauma care. **Recently supreme court of India in 2013 had passed law that those helping victim will not be harassed by police should be strictly followed allover India by administration and judiciary**.

C. Hospital-based trauma care: In India, conventionally, injury victims are offered medical care by government hospitals, private hospitals, and a huge number of private medical practitioners and institutions. Tertiary care teaching hospitals provide a reasonable level of emergency care.

District hospitals often lack trained staff, adequate infrastructure, and supply of consumables. Triage is rarely practiced, as there are no dedicated trauma surgeons and very few designated trauma centers in India. With ambiguity of responsibility amongst specialists, clinical decisions are often delayed and poly-trauma cases are vulnerable to suboptimal team management. Characteristically, the trauma care in the hospitals is provided in the casualty department. Formal training in trauma care is neither offered nor obligatory there. Doctors posted in the casualty departments often rotate from various specialties such as surgery, orthopedics, and medicine and have little commitment to trauma care. In the absence of policies delineated care of the injured, the junior most staff manages the most seriously injured citizens. The specialists and super-specialists on duty are reluctant to care for the injured and lack incentive to train the inexperienced, junior and non-specialist general duty doctors.

Holistic trauma care that reduces morbidity, mortality and disability are essentially nonexistent in our country. Instead, an upgrade of the existing infrastructure is the cost-effective approach. Time bound training of man power in the EMS and hospital care should be an additional priority. Thus, establishment of a network of institutions providing optimum trauma services with legislative backup will be the building blocks of an essential trauma care system.

iii. Proposed utilization of the experience in India:

1. **Disasters, Trauma and emergency care:** Disasters have become part of life in India with regular cyclone, flood, earthquake, and landslide. In the absence of a well-drilled EMS and trauma care service, there is a huge loss of life and residual disabilities from the disasters. Furthermore, there is a lack of coordination and communication between the multiple stakeholders, which further cannot utilize the scarce resources. So if we improve trauma care at primary, community, district level with teaching and skill development, well equipped with life saving measures we can

save huge no of patients till the definitive care come from far places in these conditions.

2. **Training and Skill development for Trauma management:** The Government of India continues to invest in the development of trauma centers. So it is imperative that trained trauma specialists dedicated Trauma Surgeons/Physician/Nurses/Technicians/Researchers have to work hand-in-hand to develop this science in India. We can plan for short term training, courses and skill development to existing manpower (doctors, nurses and technicians) from faculty to ward worker to change their mind set for trauma patient and improve management.
3. **The World Health Organization:** The World Health Day in 2004 focused on road safety with the slogan ***Road Safety is No Accident*** to emphasize the role of public health in the prevention of RTIs with six recommendations for action on road safety at a national level, it should be implemented as national program in India that includes;

- Identify a lead agency in the government to guide the National Road Safety Effort
- Assess the problem, policies and institutional settings relating to RTI and the capacity for RTI prevention in each country
- Prepare a national road safety strategy and plan of action
- Allocate financial and human resources to address the problem
- Implement specific actions to prevent road traffic crashes, minimize injuries and their consequences, and evaluate the impact of these actions
- Support the development of national capacity and international cooperation.

4. **Bystander Care of the Injured:** Bystander care" is becoming an increasingly common term in the vernacular of preparation for terrorist attacks and disasters. Dr. Rick Hunt, Director of the Division of Injury Response, CDC National Center for Injury Prevention and Control, recently called the train bombings in Madrid in 2004 "an inflection point,"

as there were more than 2,000 casualties. He pointed out the importance of bystanders to the response.

5. **Trauma Educational Program for Childhood Safety:**

Play Safe and Stay Safe with the Trauma Safety Series: The program helps children develop safe behavior patterns that will become lifelong habits. Traumaroo was developed in 1994 by the American Trauma Society to help reduce preventable injuries among children throughout the country. It may be at all below places:

- **Bicycle Safety**: It explains safe riding habits, including the use of helmets and other protective measures. Also includes accessing Emergency Medical Services.
- **Playground Safety**: It reveals tips on how to have fun in the playground while avoiding injuries. Includes access to Emergency Medical Services.
- **Staying Friends**: This segment teaches children how to control their anger when a friend reacts inappropriately.
    - **Home Safety**: The AST's most recent program instructs children on various Do's and Don'ts in and around the house.

Our recommendations to improve the trauma care at national level are:

1. Indian injury control and prevention program; The national initiatives of implementing social marketing strategies to promote and encourage prevention of Injuries. It should facilitate collection of data on Injuries so that policy and plan can be made. This program will make regulations and policies to improve Injury / trauma Prevention and Care. The program should implement its various initiatives by involving Non-Governmental Organizations(NGO) across the country to forge ahead its mission. The Model of Public Private Partnership(PPP) is unique and may be adopted during the implementation of this program. A

special focus needs to be the prevention of violence involving women, children and senior citizens.

For this program success start a nodal center/special interest group in each district under chairmanship of District magistrate with a TEAM that include judges, Mayor of district, parshad of district, Minster is any from that district, DG Police, DG Traffic police, Chief of Fire, Chief Medical Superintendent, Chief Engineer, Block development officer, Basic Education officer of district, all the government hospital (district, CHC, PHC, medical colleges), Public and private hospitals interested, NGO and Corporate agency ready to support to make a coalition at each district level under which each month meeting and planning and implementation of policy /protocol should be done.

2. National trauma registry: The Indian Council for Medical Research (ICMR) had taken step for Registry of Trauma Patients. The Clinical Registry should actively collect data on Trauma patients with respect to their clinical parameters, the care provided and outcomes. This valuable clinical data will help in creating trauma treatment guidelines to help physicians across India to treat injured patients with evidence based guidelines from India.

3.Mandating the Indian life support certification: We should make own strategy to throw medical education and medical health to introduce Indian maid and tailored life support course across the nation. with mandate Cardiac life support, adult, Pediatric, Neonatal and Obstetric Trauma Life Support Training to all health care workers, existing medical fraternity and essential to passing new medical graduates. The current certification and recertification can be law regulated and should be appreciated. Lack of certification or recertification should lead to disciplinary actions.

4.Strengthening pre-hospital emergency medical system: The government should start the process of creating uniformity in Emergency medical services and developing the infrastructure to start and sustain services like 911 in USA.

5. Essential Implementation of Injury Prevention Program:

"**Prevention is the vaccine for the disease of injury."** Injury can be described as physical damage produced by the transfer of energy, such as kinetic, thermal, chemical, electrical, or radiant. It can also be due to the absence of oxygen or heat. The interval of time over which the energy transfers or the deprivation of physiologic essentials occurs is known as "exposure." The exposure may be acute or chronic.

The **ABCDE of Injury Prevention**.

- **Analyze local injury data**
- **Build local coalitions as per needs**
- **Communicate the problem the administration and policy makers**
- **Develop prevention activities with local authorities**
- **Evaluate program interventions serially**

There should be close collaboration between various concerned ministries, department and public private partnership to incorporate and regulate injury prevention education at a various level and also safety education at work place.

Prevention strategies have more recently been categorized using the concept of the 4 "E's," those being related to:

- Education
- Enforcement (in addition to Enactment)
- Engineering
- Economic incentives and penalties.

Education strategies for injury prevention are effective in a number of ways and at varying levels. Programs can be targeted at the high-risk groups identified in populations. Examples include bicycle and helmet safety programs for children, alcohol and crash awareness programs for high school students, and violence prevention and conflict resolution programs for urban populations.

Enforcement and enactment strategies identify opportunities for injury prevention that can be legislated for the protection of all citizens in country. Examples include seat belt or car seat laws, stoplights at dangerous intersections or railroad crossing gates. Statewide efforts to promote trauma system legislation also come under this category.

Engineering is an effective way to reduce the impact of energy transmission across the host by design. Better head protection from better-designed helmets and better occupant restraints in vehicles decrease the impact that energy has and limits the effect of the injury event. When purchase costs act as a barrier, and to reinforce injury prevention legislation when voluntary participation is necessary to achieve compliance, economic incentives and penalties can serve to provide access to prevention devices, such as child restraint seats.

Injury prevention and injury control are not synonymous terms. There are 3 categories of injury PREVENTION, all of which, taken as a whole, comprise injury CONTROL:

Primary prevention: seeks to totally eliminate the injury incident from occurring.

Secondary prevention: minimizes the severity of injuries that occur during incidents that cannot be primarily prevented.

Tertiary prevention: involves efforts following the incident that will optimize the outcome from injury, regardless of injury severity.

The process involves building an injury control coalition among the relevant stakeholders, using community data to identify injury problems of priority and their causes, developing and testing solutions and interventions based on coalition consensus, implementing these interventions, and evaluating the intervention process, as well as outcome, using evaluation variables generated by the coalition.

This role in prevention efforts involve the advancement of education of the public, as well as the health care community, both in the magnitude and epidemiology of the injury problem, as well as specific risk-avoidance behaviors.Despite the broad spectrum and relative ease of participation in prevention efforts, common obstacles to involvement with injury prevention by health care providers include

uncertainty regarding effectiveness and value, role, time commitment, and costs associated with participation.

There should be local, state, regional, and national resources available on injury prevention activities like USA. Injury control must be community based and encompass a multidisciplinary approach. Public information and education are key components of any injury control program to garner grassroots support, as well as to influence legislative and health care policy initiatives. Behavioral and cultural modifications brought about through educational strategies and primary injury prevention programs are slower to take effect, but equally important and necessary to optimize injury control. Health care providers should be involved in the intervention design process and selection of the action plan. Measurement of effect is an essential component of prevention efforts.

Summary:

Trauma is a preventable disease of modern world that kills health young productive generation of nation and affect the people and national growth and development. There is definitive role of comprehensive trauma management and system organization that improves the patient outcomes. The nationwide response to injury control and prevention require commitment from both governmental and professional organizations. The momentum from the political leaders, policy makers and national and international community needed commitment, support and law enforcement. The government has to recognize traumatic / accidental injury as an important health issue and intensify support for both prevention and system-wide management response. Indian injury prevention requires an integrated and coordinated vision from all stakeholders, including concerned ministries and departments to individual caregivers. Everyone has to understand that he had an important role in this novel endeavor.

ICMR Sanction No. INDO/FRC/452/Y-91/2015-16-IHD, dated 24th Sept 2015.

Signature of ICMR-IF
(DR SANDEEP SAHU)