

IMPLEMENTING THE EMERGENCY SEVERITY INDEX TRIAGE SYSTEM IN JAMAICAN ACCIDENT AND EMERGENCY DEPARTMENTS



Authors: Simone French, DM, Georgiana Gordon-Strachan, PhD, Kevon Kerr, MSc, Jacqueline Bisasor-McKenzie, DM, Lambert Innis, DM, and Paula Tanabe, PhD, RN, FAAN, FAEN, Jamaica, West Indies, and Durham, NC

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Contribution to Emergency Nursing Practice

- The current literature on the use of the emergency severity index (ESI) triage system globally indicates a need to improve implementation processes in countries outside the United States.
- This article contributes a report on the rigorous implementation process used to implement the ESI in Jamaica.
- Key implications for emergency nursing practice found in this article include a description of how a train-the-trainer model can be used to guide implementation of the ESI as well as other training programs globally.

Accident and Emergency Departments (A&Es) in Jamaica are overcrowded; in 2017, a total of 620,058 ED visits were recorded islandwide.¹ The potential for negative outcomes is high as patients experience long waits for a full physician evaluation and

diagnostic workup. The Ministry of Health (MOH) recognized the need to implement a valid and reliable triage system in Jamaica to ensure patient safety.

There are 19 local hospitals across Jamaica with 24-hour A&Es across the island. The health system is organized into 4 geographical regional health authorities: South East Region (SERHA) containing 7 24-hour hospital emergency departments; North East (NERHA) and Western Region (WRHA), each containing 4; and Southern Region (SRHA), containing 5 A&Es. Historically, Jamaica has used a wide variation of 3-, 4-, and 5-level triage systems across these hospitals. Many of these triage systems are poorly defined. The use of 5-level systems began to appear in the literature in the 1990s. Systems included the Australasian, Manchester, Canadian Triage and Acuity System (CTAS), and the Emergency Severity Index (ESI). Evidence of reliability and validity for all systems has been documented, with the largest literature existing for the CTAS and the ESI. Inter-rater reliability (agreement among different raters) of ESI ranges from 0.69 to 0.89.²⁻⁴ Validity with respect to the proportion of patients admitted to the hospital per ESI triage category, 60-day all-cause mortality by ESI level, as well as number of resources used, has also been demonstrated to be very good.³⁻⁶ Emergency nurses have reported high levels of satisfaction with use of ESI.⁷ In addition to being used in over 57% of emergency departments in the United States,⁸ ESI has been implemented in Germany, Greece, Netherlands, Iran, Brazil, Taiwan, France, Saudi Arabia, and Abu Dhabi.^{9,10}

One hospital on the island, The University Hospital of the West Indies (UHWI), the primary teaching hospital in Jamaica, implemented the ESI in 2007. Beginning in 2004, nurses and physicians in the emergency medicine training programs were taught the ESI at UHWI. Training materials were used that are available online at no (books) or low (web course) cost, minimizing the barriers to learning ESI.¹¹ After the successful implementation of ESI at UHWI in 2016, the MOH decided to implement the ESI as the triage system of choice across Jamaica. Several factors influenced the

Simone French is Consultant Physician at University of the West Indies, Jamaica, West Indies.

Georgiana Gordon-Strachan is Professor at University of the West Indies, Jamaica, West Indies.

Kevon Kerr is at University of the West Indies, Jamaica, West Indies.

Jacqueline Bisasor-McKenzie is Emergency Physician, Disaster Management and Special Services Branch, Ministry of Health, Jamaica, West Indies.

Lambert Innis is Emergency Physician, Disaster Management and Special Services Branch, Ministry of Health, Jamaica, West Indies.

Paula Tanabe is Professor at Duke University School of Nursing, Durham, NC. Drs Tanabe and French were paid as consultants by the Ministry of Health for this project. Dr. Tanabe is a member of the ESI Triage Research Team LLC.

For correspondence, write: Paula Tanabe, PhD, RN, FAAN, FAEN, 307 Trent Drive, MC 3322, Duke University School of Nursing, Durham, NC, 27710; E-mail: Paula.tanabe@duke.edu.

J Emerg Nurs 2019;45:124-31.

Available online 24 December 2018
0099-1767

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<https://doi.org/10.1016/j.jen.2018.11.010>

TABLE 1

RE-AIM framework and application to the train-the-trainer program and implementation of ESI in Jamaica

RE-AIM element	Definition	Application to the training and implementation
Reach (Who?)	Physicians and nurses in Jamaica A&Es	Physicians and nurses in most A&Es in Jamaica triage and selected trainers were included in the training. All trainers were expected to then train all physicians and nurses in their A&E on the use of ESI.
Effectiveness (What?)	Outcomes and unanticipated consequences	Accurate use of ESI, acceptable reliability and validity. Prevents negative patient outcomes at triage. During the train-the-trainer session, 35 cases were reviewed, and the correct ESI level and rationale was discussed.
Adoption (Where?)	What proportion of A&Es and staff (MDs and RNs) is ESI adopted?	All 19 A&Es reporting to the MOH in Jamaica were trained and were expected to implement ESI by September 1, 2017. Individual A&E differences in how resources are used were discussed in the training and how these differences would affect how an A&E will assign a triage level, based upon that A&Es routine use of resources, as defined by ESI criteria.
Implementation (How?)	How consistently is ESI implemented across A&Es	Individual A&Es will be required to report when and the number of all physicians and nurses trained to the MOH.
Maintenance (When?)	How are the intervention and components maintained?	Plan for continued training and retraining of new physicians and nurses will need to be developed. Trainers will be encouraged to attend monthly learning collaborative sessions for 9 months. Individual A&Es will be encouraged to develop a quality-improvement monitoring plan. Continued oversight by the MOH. Congruence with the MOH A&E policy.

A&E = Accident and Emergency Departments; ESI = emergency severity index; MOH = Ministry of Health; RE-AIM = Reach, Effectiveness, Adoption, Implementation, Maintenance.

decision to implement the ESI. To prevent medical deterioration in the waiting room, acuity must be assessed accurately at triage. It was determined that using a 5-level system with good reliability and validity would allow a more accurate picture of A&E acuity in each hospital. The MOH could use these statistics to describe acuity across all A&Es. This comparison could guide resource allocation and policy development. The ESI triage system was selected because it meets all these criteria.

Given the mixed results of inter-rater reliability of the ESI internationally, we developed a comprehensive and thoughtful approach to implementation. The purpose of this paper is to report a project implementation and the detailed planning process to implement the ESI triage system throughout Jamaica using the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) model as an organizing framework. We briefly discuss our plans for maintenance of implementation.

Workshop Planning and Implementation

CONCEPTUAL FRAMEWORK: RE-AIM

The RE-AIM model is a commonly used implementation framework to facilitate and maintain system change.^{12,13} Table 1 describes the components of the model used to guide ESI implementation and maintenance. The “reach” components are framed within “who, what, how, and when” questions. We also used the RE-AIM model to guide the development and implementation of our train-the-trainer workshops. The framework can be used to evaluate the long-term success of implementation of the ESI triage system in Jamaica. More broadly, RE-AIM can be used to guide program implementation.

PROJECT AND WORKSHOP PLANNING

The MOH oversaw the entire planning and implementation process. Project and workshop planning activities were led by the Director of Emergency Medical Services from the MOH who developed the implementation plan along with a consultant emergency physician from the University of West Indies (S.F.) and a member of the ESI Triage Research Team (P.T.). S.F. is a Consultant Physician at the University of West Indies and implemented ESI there in 2007. P.T. is a member of the ESI Triage Research team that developed all the training materials and has taught ESI throughout the US. She also has conducted research with the tool. Together, the consultants and representatives from the MOH determined that the use of train-the-trainer workshops would be the best model to implement ESI.

The team developed workshops to train A&E physicians and nurses on the use of ESI. In Jamaica, both A&E physicians and nurses triage patients. We administered baseline surveys to assess previous experience with ESI, compliance with pre-workshop requirements, and perceptions of anticipated feasibility of implementation and acceptance by A&E physicians and nurses. Institutional Review Board (IRB) approval was obtained from the MOH and the authors’ universities (deemed exempt). All participants who attended the workshops signed an informed written consent at the beginning of the train-the-trainer workshop. Participants consented to completion of the feasibility and acceptability surveys as well as participation in the training sessions.

A&E SELECTION

The MOH carefully evaluated the intended reach of the project. There are 4 health regions with 19 A&Es that operate 24 hours a day in Jamaica (Figure). To maximize reach, all 19 hospitals were included in the implementation.

TRAINER SELECTION

Trainers at each A&E were selected and required to attend a train-the-trainer workshop. Trainers were advised that they would be required to train all physicians and nurses in their A&E and form a site ESI triage quality improvement team. Trainers included physician and nurse heads of the emergency department, the nurse in charge of in-service training, and selected nurses and physicians. Some of the physicians and nurses who were selected had formal training in emergency medicine and had been taught ESI previously.

PRE-WORK AND MOH SENSITIZATION SESSIONS

Before attending the workshop, trainers received the ESI Triage Training Manual and DVD purchased by the MOH for the cost of shipping. Trainers were also required to complete the online ESI training course before attending the train-the-trainer workshop¹⁴ and to bring a copy of their certificates of completion to the workshop. The training course cost, established by the ESI Triage Research Team, is \$15 USD. To support the training costs, the Ministry obtained funding from the Pan-American Health Organization.

To ensure successful implementation, representatives from the MOH conducted in-person sensitization sessions with heads of A&Es as well as higher-level administration before the train-the-trainer sessions. These discussions were with chief executive officers, senior medical officers, A&E medical directors, matrons, and senior medical records personnel. Each session emphasized the reasons the MOH was adopting ESI island-wide and the benefits to patients and administrators and the nation of Jamaica. The importance of successful implementation of ESI was emphasized.

TRAIN-THE-TRAINER WORKSHOPS

Over the course of 4 days (June 6–9, 2017), 4 workshops covering 19 A&Es in 4 health regions were planned. Workshops were conducted by the Consultant Physician from the University of West Indies (S.F.) and P.T., a member of the original ESI Triage Research Team, whose experience was described previously.

Public Hospitals Located in Jamaica

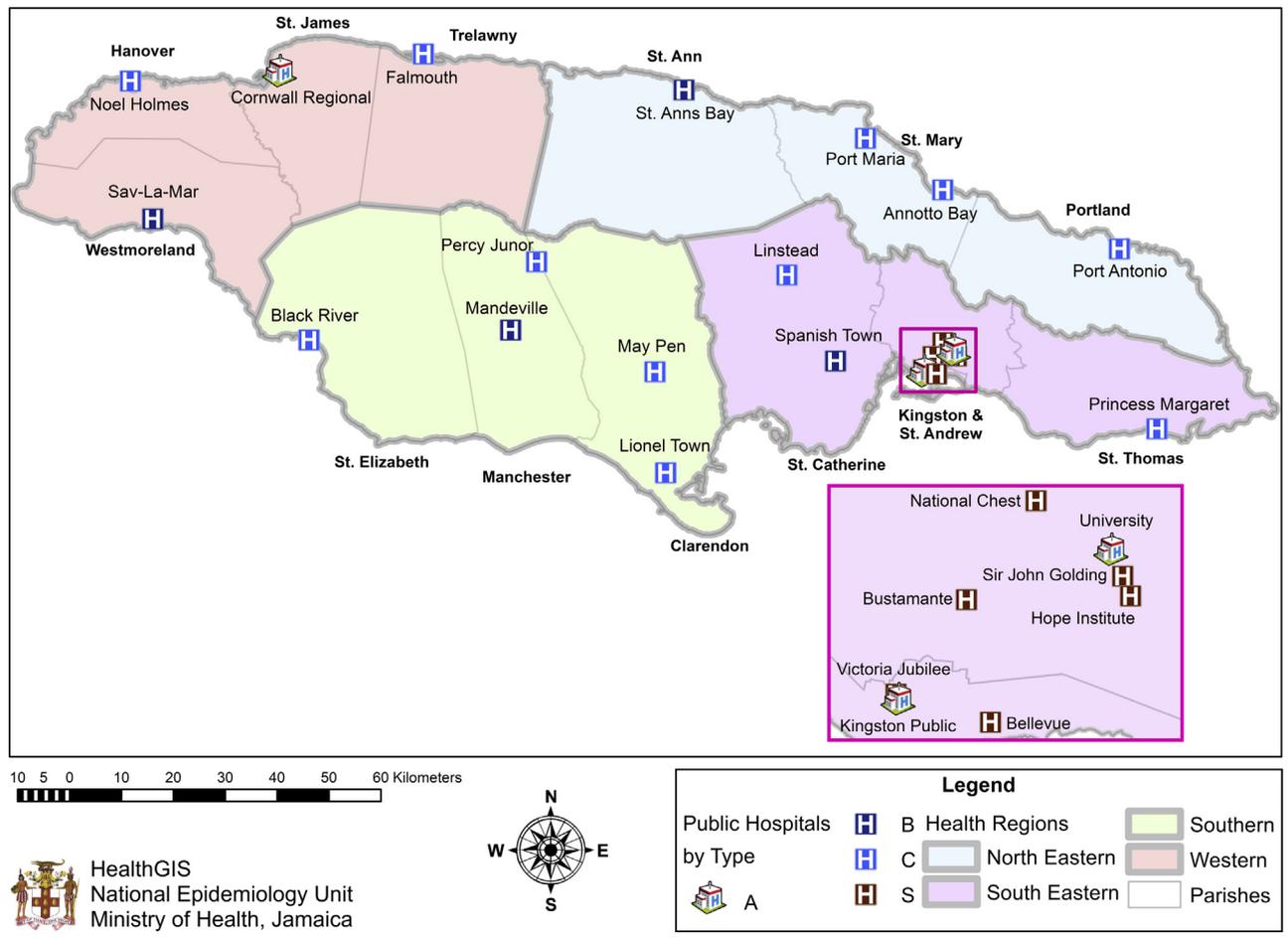


FIGURE
Public hospitals with an A&E in Jamaica.

On the day of the workshop, the morning focused on understanding and applying the ESI criteria. The first hour included an overview of the ESI algorithm, with in-depth discussion of elements of the algorithm ESI resource definitions; the importance of adherence to the algorithm to maintain reliability and validity was discussed in depth. The group discussed 35 cases and assigned an ESI level to each case. Cases included all triage levels, high-risk situations, pain, and definition of resources. Lunch was provided each day.

Afternoon sessions focused on the role and responsibility of trainers to train all providers and implement ESI at their individual A&Es. Attendees were mandated to develop a training schedule for their A&E. The MOH representative asked all institutional training teams to submit their training

plans to the MOH within 2 weeks. The target date established for implementation of ESI in all A&E departments was September 1, 2017.

The consultants shared specific strategies used in the past that were associated with successful implementation of ESI. To enhance the maintenance after implementation, learning collaborative sessions were planned. Beginning in October 2017, each A&E was instructed to randomly select 2 cases for review and submit them for calculation of inter-rater reliability and discussion at a monthly webinar conducted by S.F. and P.T. for 9 months. All sites were strongly encouraged to participate in the monthly webinars. The day ended with celebration of completion and presentation of certificates.

SURVEY ADMINISTRATION AND STUDY OUTCOMES

To understand the baseline status of ESI use at each A&E as well as completion of pre-workshop coursework and anticipated feasibility of implementation at their site, participants completed brief surveys at the beginning of the workshop. Items included demographic and provider characteristics, self-report of previous use of ESI, pre-workshop coursework completion (whether they had reviewed the ESI manual and completed the online ESI web-course before the train-the-trainer session), and perceptions of feasibility and acceptability of ESI implementation at their A&E as well as perceived acceptability by physicians and nurses. Items used a 4-point Likert scale (strongly disagree = 1 through strongly agree = 4). The implementation team developed the survey.

STATISTICAL ANALYSIS

We calculated descriptive statistics of workshop and web-course completion as well as anticipated feasibility and acceptability. Data were analyzed using SPSS version 21 (IBM Corp, Armonk, NY). The chi-square test was used for all inferential statistics owing to the categorical nature of the variables. Continuous variables, such as age and years of experience in the A&E, were summarized, using means and standard deviation.

Results

A total of 112 (77% female) A&E physicians ($n = 57$) and nurses ($n = 44$) were trained over 4 days from 19 A&Es, throughout the 4 MOH regions in Jamaica. There was a significant difference in occupation by gender ($P = 0.001$), with 97.7% of the nurses and 61.4% of the physicians being women. There was good participation in the workshops and completion of pre-workshop online ESI training across all regions (Table 2).

Only 26.6% of respondents reported that they had ever used the ESI (Table 3). Among the health regions, more persons from the SERHA (40.7%, Table 3) had previously used the ESI. Implementing the ESI in their A&E was thought to be feasible by 89.2% of respondents. Significantly more persons who previously used the ESI (96.5%) believed that it was feasible to implement it in their A&E than those who had never used it (86.4%) in the past ($P = 0.017$). Acceptance of the ESI by both physicians and nurses was high: 89.1% and 90.5%, respectively.

TABLE 2
Workshop attendance and online course completion per region

	Total attendance (n)	Completed online course before workshop (n)
SERHA	35	28
SRHA	30	27
NERHA	24	21
WRHA	23	22
Total	112	98 (88%)

NERHA = North East Region Health Authority; SERHA = South East Region Health Authority; SRHA = Southern Region Health Authority; WRHA = Western Region Health Authority.

There were no significant differences between the regions in terms of feasibility of implementation and acceptance of the ESI by physicians and/or nurses or between physicians and nurses.

Discussion

Several factors were instrumental in the successful attendance of our training to implement ESI including MOH support, careful planning using existing low- to no-cost materials, and expertise of the research team. The REACH model helped ensure that we included providers who would be responsible for implementation and triage from all regions. Critical aspects of the training were based upon previous research and experience to ensure ESI is applied in a reliable and valid manner. A discussion of maintenance was also important. We found the REACH model to be valuable in planning the training and conducting the workshops.

The majority (88%) of physicians and nurses who participated in the workshops completed the online course before attending. The high proportion of persons completing the online ESI training before the workshop demonstrates that it is possible to use this “pre-course work” method. We believe that the MOH designation of this activity as a priority in the national interest was a significant factor. Several reminders were sent to participants before the training days. A representative from the MOH conducted sensitization sessions with key stakeholders at each hospital prior to the training in each region and discussed the importance of implementation at each session. The MOH also clearly articulated accountability with expected scheduled dates of implementation and selected

TABLE 3
Training, acceptability and feasibility stratified by regional health authority

Variable	WRHA	NERHA	SERHA	SRHA	Total	P value
Have you ever used ESI before?	n = 16*	n = 16	n = 27	n = 21	n = 80	
Yes (%)	13.3	18.7	40.7	23.8	26.6	
Did you review the ESI Triage manual?	n = 15	n = 16	n = 27	n = 21	n = 79	
Yes (%)	100.0	100.0	100.0	90.5	97.5	
Did you complete the online ESI training webcourse?	n = 15	n = 16	n = 27	n = 21	n = 79	
Yes (%)	100.0	93.7	92.6	76.2	89.9	
It is very feasible to implement ESI in our A&E	n = 14	n = 15	n = 27	n = 18	n = 74	
1 – Strongly disagree	7.1	6.7	7.4	0.0	5.4	.612
2 – Disagree	14.3	6.7	0.0	5.6	5.4	
3 – Agree	28.6	20.0	40.7	44.4	35.1	
4 – Strongly agree	50.0	66.6	51.9	50.0	54.1	
Physicians will accept ESI in our A&E	n = 14	n = 15	n = 27	n = 18	n = 74	
1 – Strongly disagree	0.0	6.7	3.8	5.6	4.1	.690
2 – Disagree	7.2	6.7	7.4	5.6	6.8	
3 – Agree	57.1	20.0	48.1	55.5	45.9	
4 – Strongly agree	35.7	66.6	40.7	33.3	43.2	
Nurses will accept ESI in our A&E	n = 14	n = 15	n = 27	n = 18	n = 74	
1 – Strongly disagree	0.0	6.7	3.7	0.0	2.7	
2 – Disagree	7.1	6.7	7.4	5.6	6.8	.623
3 – Agree	50.0	26.6	55.6	66.6	51.3	
4 – Strongly agree	42.9	60.0	33.3	27.8	39.2	

A&E = Accident and Emergency Department; ESI = emergency severity index; NERHA = North East Region Health Authority; SERHA = South East Region Health Authority; SRHA = Southern Region Health Authority; WRHA = Western Region Health Authority.

* "n" represents the number of responses per question.

a “go-live” date. Attendance at the monthly webinars and post- train-the-trainer workshop was strongly encouraged. We used consultants with experience in the development and implementation of ESI to plan and conduct the workshops. We believe that all of these factors enhanced the success of the workshop.

There were several other factors that most likely contributed to the success of conducting the workshops island-wide. Each workshop was conducted within the 4 different regions, limiting travel of attendees. Nurses and physicians were included. The majority of the time was devoted to discussing either challenging cases or an aspect of ESI (eg, high-risk patients, resources, and pain as a chief complaint).

During the training, we noted important differences in training ESI in Jamaica compared with the US. A unique aspect of the ESI triage system is the definition of what does and does not count as a resource. When

patients do not meet either ESI level 1 or 2 criteria, providers must count anticipated resources, up to 2. The distinction between 0 to 2 anticipated resources guides selection of ESI level 3, 4, or 5. We noted several differences in the availability of resources among A&Es that reflect differences due to a low- to middle-income country such as Jamaica. For example, many A&Es do not have oral analgesics available for administration in the A&E. This results in the administration of intramuscular analgesics, which counts as a resource when using ESI, whereas oral analgesics do not count, resulting in the assignment of a different triage level. During the trainer workshops, we spent a significant amount of time exploring this topic and explaining how to train physicians and nurses at their A&E related to this topic.

Trainers generally agreed that it would be feasible to implement ESI in their A&E, despite a low level of

previous exposure to it (26.6%). The high level of acceptance seems to reflect the motivation of providers, which may be attributable to the MOH involvement as well as individual internal factors. Providers also expressed the need to use a new system to improve reliability and their dissatisfaction with the current triage systems. Participants who had used ESI previously were more likely to report a high feasibility of implementation; this is not surprising. Previous use would increase familiarity with the tool.

Maintenance is a key factor in any system change. With the support of the MOH, the implementation of ESI is ongoing. To ensure inter-rater reliability and maintenance, the MOH monitored all 19 hospitals to ensure that training was completed. Subsequent to the training, a representative from each hospital training team was asked to participate in a case-based monthly learning collaborative session, which was offered as a webinar led by the consultants (S.F. and P.T.). Monthly 1-hour webinars led by the consultants were offered from October 2016 through June 2017. The webinars reviewed the accuracy of real triage cases submitted monthly by each site (each site was asked to select 2 cases randomly) and provided an opportunity to reinforce ESI principles. Each training team was expected to use these experiences to enrich the ESI training in their institution. Future work will report the inter-rater reliability of scoring and the experience of the learning collaborative sessions.

Limitations

It is important to note that although all participants completed questionnaires, not all respondents answered every question. This may have reflected some lack of comfort or understanding of the questionnaire and a reluctance to record an answer for some items. Finally, this paper reports the process of implementing a triage system island-wide but does not report the success of implementation with regard to accuracy of its application. Future work will report on reliability and validity of the ESI in Jamaica after implementation.

Implications for Emergency Nurses

Triage is one of the most important responsibilities in emergency nursing. The ESI is used globally. To ensure the criteria are applied accurately, and to retain reliability and validity of ESI, training efforts must be rigorous. Although

we implemented ESI, the steps we took can be used to implement training or other programs in low- to middle-income countries, globally. Dedicated support from ministries of health or local hospital administration, as well as rigorous training, are critical for successful implementation of ESI globally. Emergency nurses must take the lead and responsibility for this important practice change. The RE-AIM model was found to be a strong guiding framework that can be used to implement a practice change in the emergency department. Finally, we were sensitive to cultural and health care system differences when planning implementation and maintenance.

Conclusion

In summary, we report the development and implementation of training to implement the ESI triage system in Jamaica. Guided by the RE-AIM framework, successful trainer sessions were held with maximal reach. Participants reported a high level of feasibility and acceptability regarding implementation of ESI in their A&Es.

Acknowledgments

Funding for this project was obtained from the Pan-American Health Organization, and we thank the Ministry of Health for Jamaica for their support of this initiative, as well as all the trainers for their enthusiastic participation. Finally, we thank Shaquera Adams from the MOH for her endless logistical planning and support of this project.

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