A META ANALYSIS OF FISCAL LOSS AND FRAUD PREVENTION IN DISASTER RECOVERY CONSUMER AND VICTIM POPULATIONS

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Abstract
Distribution networks post disaster have integral structural weaknesses due to the compressed timeline for movement of resources. In the case of financial support distribution, including grants, loans, and donations, these network instabilities have a causal relationship to fraud. Standard operating procedures within organizations can mitigate loss and fraud. However, the inherent and redundant nature of standard operating procedures allow for calculable behavior that can be compromised or worked around. Research compiled by the Association of Certified Fraud Examiners indicates a 5% standard of fraudulent loss to any given business. It is hypothesized that the percentage of loss during a disaster recovery is well beyond the norms found during non-disaster situations. In 2006, The New York Times reported that the United States Federal Emergency Management Agency experienced an 11% loss of funding due to over payments and fraud during a single disaster. This loss can be attributed to oversight failures and intentional criminal activity. A meta-analysis of disaster recovery loss and fraud across specific events and years is examined, along with causal sources of the loss. Given specific network or distribution failures, it is possible that efforts to defraud could be predicted or anticipated. Once identified, safeguards could be implemented, ideally without reducing operational functionality.

Introduction
It is frequently said that an agency can assist disaster victims quickly or efficiently, but not both. There is no disputing that the accelerated distribution of resources to victims post-disaster creates structural or procedural weaknesses in the distribution network. While wasted resources and poor communication are not negligible, they can be identified as primarily the failures of internal operating processes of the agency. The convergence of an agency's direct financial assistance and the public, however, creates the potential for fiscal loss through intentional fraudulent activity. It can be reasonably asserted that those who benefit from fraud inherently find direct financial support a far more attractive target than other resources, leading to a significant economic loss to the agency and the reduction of available aid for actual disaster victims.

Emergency management professionals should treat fraud as an analogous microcosm of disasters in general, an unavoidable part of providing public aid. As such, a cycle of preparation and mitigation may be initiated, potentially reducing the fiscal impact of fraud on distributive aid.

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Thesis

The impact of fiscal loss attributable to fraud can be extrapolated by integrating the data from the most expensive disasters (FEMA, 2007), calculating the impact of inflation (BLS, 2007), and estimating the impact of fraudulent activity. Table 1 (below) summarizes the total cost of the ten most expensive Presidentially-declared disasters in terms of historical cost and the 2007 equivalent as adjusted for inflation (BLS, 2007).

Table 1: Total Cost of Historical Disasters by Fiscal Impact

Disaster	Actual $	Inflation %	Adjusted 2007 $
Hurricane Katrina*	$29,318,576,948	6.7537122%	$31,298,669,256.20
Attack on America - WTC	$8,818,350,120	17.7244495%	$10,381,354,133.75
Northridge Earthquake	$6,978,325,877	40.6815115%	$9,817,214,321.16
Hurricane Rita	$3,749,698,351	6.7537122%	$4,002,942,185.99
Hurricane Georges	$2,245,157,178	27.9079755%	$2,871,735,093.17
Hurricane Andrew	$1,813,594,813	48.6029936%	$2,695,056,183.89
Hurricane Ivan	$2,431,034,355	10.3705664%	$2,683,146,386.99
Hurricane Wilma	$2,110,738,364	6.7537122%	$2,253,291,558.40
Hurricane Charley	$1,885,466,628	10.3705664%	$2,081,000,196.61
Hurricane Frances	$1,773,440,505	10.3705664%	$1,957,356,330.14

* FEMA reports Hurricane Katrina approximately 68% funded.

Although the exact extent of fraud is difficult to determine with any accuracy, the Association of Certified Fraud Examiners estimates that five percent of an organization's annual revenue is lost to fraudulent activity (ACFE, 2006). This estimate applies approximately equally to various industries, but one can hypothesize that the rate of loss is significantly higher during disaster recovery operations, where the emphasis on expedited delivery of funds, goods, and services compromise existing safeguards. A preliminary analysis conducted by The New York Times in the midst of recovery operations related to Hurricanes Katrina and Rita estimated an 11% rate of loss due to fraud (Lipton, 2006), reflective of approximately two billion dollars of the $19 billion spent for recovery as of June 2006. For comparison, Table 2 (below) applies a 5% estimate and an 11% estimate of loss attributable to fraud to the disasters noted in Table 1.

Table 2: Estimated Rate of Loss Attributable to Fraud

Disaster	Adjusted 2007 $	5% Rate of Loss	11% Rate of Loss
Hurricane Katrina	$31,298,669,256.20	$1,564,933,462.81	$3,442,853,618.18
Attack on America - WTC	$10,381,354,133.75	$519,067,706.69	$1,141,948,954.71
Northridge Earthquake	$9,817,214,321.16	$490,860,716.06	$1,079,893,575.33
Hurricane Rita	$4,002,942,185.99	$200,147,109.30	$440,323,640.46
Hurricane Georges	$2,871,735,093.17	$143,586,754.66	$315,890,860.25
Hurricane Andrew	$2,695,056,183.89	$134,752,809.19	$296,456,180.23
Hurricane Ivan	$2,683,146,386.99	$134,157,319.35	$295,146,102.57
Hurricane Wilma	$2,253,291,558.40	$112,664,577.92	$247,862,071.42
Hurricane Charley	$2,081,000,196.61	$104,050,009.83	$228,910,021.63
Hurricane Frances	$1,957,356,330.14	$97,867,816.51	$215,309,196.31
	Total Estimates:	**$3,502,088,282.32**	**$7,704,594,221.09**

While the full extent of fraud cannot be positively discerned, it is certainly noteworthy that the combined of fraud lost to these ten disasters can be estimated to have more economic impact than the Gross Domestic Product of Mozambique or the Bahamas (CIA, 2006).

By examining historical data from disasters in which contemporary distribution networks of financial resources were utilized, one can identify specific vulnerabilities that have resulted in the fraudulent receipt of funds. This paper seeks to identify weaknesses in the distribution of financial resources and identify how those weaknesses could be addressed by implementing procedural safeguards that would reduce the extent of fiscal loss during aid disbursement without a significant reduction in agency capability during disaster recovery operations.

Identification of Operational Vulnerabilities

Aid Disbursements to Ineligible Individuals

Perhaps the simplest incident of disaster recovery fraud to identify is the submission of fraudulent information. The details vary, however, when one analyzes the type of fraudulent information that resulted in an aid payment:
- Name
  - Incidents when an aid applicant registers under several fraudulent names, sometimes claiming to be multiple people so as to inflate the number of "residents" at a given address for the purposes of collecting additional disaster aid.
- Social Security Number
  - "FEMA made millions of dollars in payments to thousands of registrants who submitted SSNs that have not been issued or belonged to deceased individuals. Our data mining also detected that FEMA made tens of thousands of payments to registrants who provided other false or duplicate information on their registrations" (GAO, 2006).
  - Numerous incidents of individuals receiving payments for registering with social security numbers that do no belong to them, sometimes involving one individual using as many as 15 fraudulent social security numbers to receive multiple payments (GAO, 2007).
- Address
  - A legitimate disaster victim "recruited" residents of the town to which he relocated so they could send in fraudulent assistance applications using his damaged address as their own (Fisher, 2006).
- Status of eligibility to receive aid
  - FEMA awarded a total of at least $3 million to over 500 foreign students, nonqualified aliens, studying in the United States (GAO, 2007)

In the case of the Gulf Coast hurricanes, there was an inadequate ability to track multiple distributions of aid to the same individuals, whose receipt of aid made them ineligible for repeat assistance of the same type. A GAO audit reflects that "one individual received 8 expedited assistance payments using the same name, [social security number], and current address" (GAO, 2007).

Housing Assistance Fraud

Housing assistance is a vital part of post-disaster recovery operations by providing temporary or semi-permanent homes to disaster victims which allows them to start rebuilding their lives. However, a failure to track distributed aid resulted in FEMA providing $17 million in rental assistance to victims of Hurricanes Katrina and Rita who had already been provided with free housing (GAO, 2007).

Failure to Cross Reference Aid Disbursements over Multiple Disasters and Years

Resource tracking is essential for identifying asset misappropriation in any industry, and emergency management is no exception. FEMA current tracks the aid provided during individual disasters, organized by Presidential Declaration number. This, however, provides an opportunity for a legitimate victim of one disaster to fraudulently claim damage during subsequent disasters.

Illustration 1: Selected Hurricane Paths Impacting the Gulf Coast and Florida
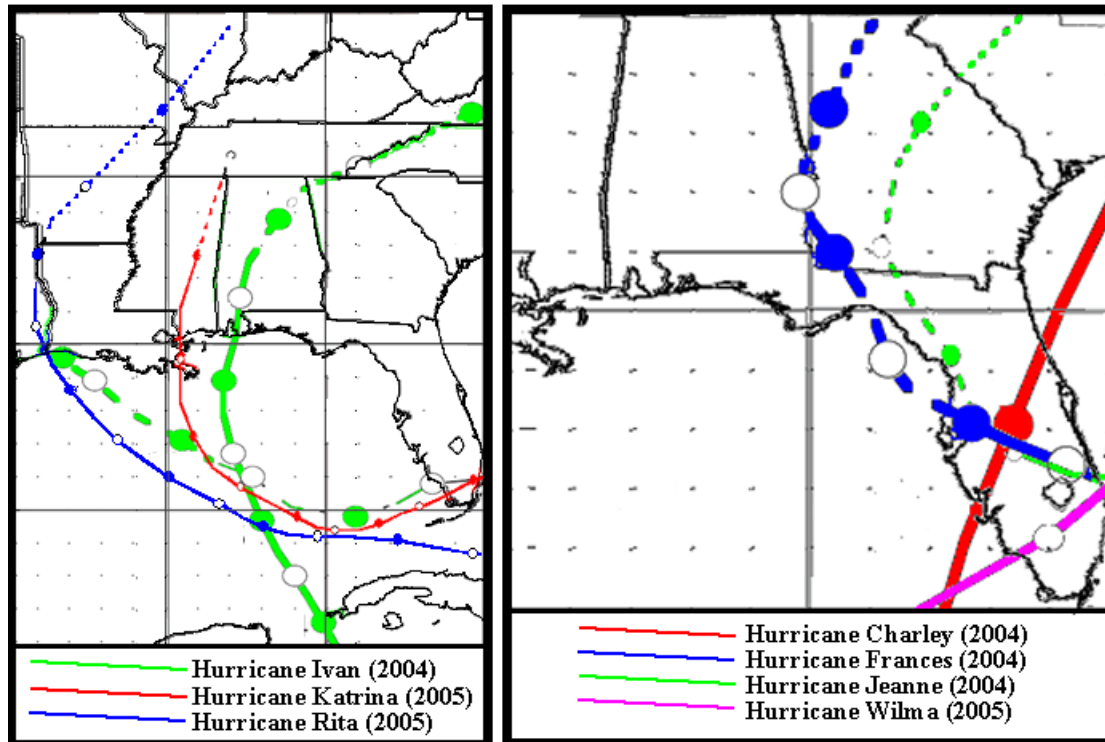
It is not uncommon for multiple disasters to affect a single geographic location in a limited time period. Illustration 1 (above) documents paths of several hurricanes that damaged several Gulf Coast states during the 2004 and 2005 storm seasons. Due to the tracking system in place – by presidential declaration number – residents of the affected areas were able to successfully register and receive multiple disbursements of financial aid for the same property damage. According to an audit performed by the Government Accountability Office, "FEMA made nearly $20 million in duplicate payments to thousands of individuals who submitted claims for damages to the same primary residences from both Hurricanes Katrina and Rita" (GAO, 2007).

Lack of Adequate Identification Verification

Confirming an individual's identification by relying upon their Social Security Number is hardly revolutionary, yet historical data reveals a significant failure in detecting fraudulent identities. According to a GAO audit, FEMA made "millions of dollars in payments to thousands of registrants who submitted [social security numbers] that have not been issued or belonged to deceased individuals" (GAO, 2006) after Hurricanes Katrina and Rita.

The Social Security Administration provides free identification verification services to employers (SSA, 2008). By incorporating a similar verification process through the integration of government databases, it would be possible to institute registrant verification as part of every registration. This contrasts with the process in place during the 2005 hurricane

season, in which telephonic applications for aid did not include the same verification of a registrant's identity as applying for aid over the Internet (GOA, 2006).

A real time verification process, by which several variations of registrant's name are checked against the provided Social Security Number, is not anticipated to significantly hinder the aid application approval process. The Social Security Number Verification Service currently offered by the Social Security Administration allows employers to receive immediate verification for up to 10 individuals or receive results within one business day for up to 250,000 individuals. In a fully integrated process, each applicant's identity would be verified during the registration process, resulting in a large number of simultaneous individual verifications. Even should real-time verification prove technologically infeasible, FEMA could incorporate the verification process during the several days it takes for a registrant's file to be completed.

<u>Lack of Tracking Denied Aid Applications</u>

One of the GAO's audit findings after Hurricanes Katrina and Rita was that individuals whose aid applications were denied over the internet were often able to receive the aid by registering with the same information over the telephone (GAO, 2007).

During the identity confirmation phase of a financial aid application, the registrant supplied data should be cross-referenced against a listing of known fraudulent identities, including identities whose previous aid applications were terminated or denied. This cross referencing should be complete before aid is authorized either over the phone, via the internet, or in person. If this information were adequately tracked and applied to aid registrants, identifying a telephone registrant as someone who previously attempted to apply for aid over the internet would be an automated process. While this should not be taken as a definitive measure of fraudulent activity, it should identify the application as one that requires closer scrutiny and, if applicable, additional confirmation of the registrant's identity.

Procedural Safeguards to Reduce the Fiscal Impact of Fraudulent Activity

<u>Comparison of Applicant Provided Data with Known Data</u>

The investigation of fraud relies in part on the nature of the crime itself, which almost necessitates the production of a data trail that may be followed backwards to identify a perpetrator. We suggest leveraging the data provided by aid applicants to reduce the incidents and fiscal impact of fraud during disaster recovery operations. A common theme of the structural weaknesses identified above is the lack of organizational cohesion; a failure to consider and compare data from multiple sources during the approval of an application for aid. Ideally, all of the relevant data in each aid application would be compared to data obtained during both the current disaster and previous disasters. This comparison would be used to implement a series of graduated flags, a system by which different pieces of information are assigned a numerical score based on the propensity of that data to identify duplicate aid applications. Each application file would include an aggregate score for that registrant and registrants with an aggregate score above a certain value would be subject to additional review.

For example, an agency may arbitrarily set a numerical scale in which higher numbers are associated with a progressively increased risk of fraud. Each application for post-disaster aid would be subject to an automated, data-based review that would, at a minimum, analyze the registrant's name, date of birth, social security number, and address. Each of those fields would be compared against other resources. The Social Security Administration, for example, could identify whether each social security number properly corresponds with the

given name and date of birth. A registrant's address would be compared with a database of financial aid provided during previous disasters to reduce the risks associated with providing aid to a single recipient over multiple disasters. Some recommended comparisons include:

- Previous aid disbursed to registrants' names and social security numbers
    - Intended to reduce the likelihood of a single aid applicant receiving both rental assistance and rent-free housing
- Duplicate and near-duplicate names and social security numbers in the current and previous disasters
    - Intended to address the possibility of a single aid applicant receiving separate incidents of identical financial assistance over multiple disasters
- Multiple names registered with a single address and multiple addresses registered to a single name
    - Intended to reduce the possibility of unaffected people using an affected address to register for benefits
- Duplicate and near-duplicate information submitted in aid applications that were previously denied
    - Intended to reduce the likelihood of someone circumventing a denial of aid received through one registration method (such as the internet) by registering for aid through another method (such as via telephone)
- Address verification through property appraiser information to verify that an address actually exists
- Address verification through an affected area GIS utility to verify that an address falls within the disaster affected area

When one applies a real world example of fraud identified through standard investigative means, the value of a preemptive system of identity and eligibility confirmation becomes clear: after Hurricanes Katrina and Rita, a group of eight people received payments totaling over $92,000 after filing 31 aid registrations using 26 social security numbers that did not belong to them and 22 addresses that did not exist (GAO, 2006). Leveraging comparative data principles would have preemptively identified this group's fraudulent applications as worthy of additional scrutiny. Individually, an address or social security number that fails the verification process is of interest, but a comprehensive collection of comparative information lends itself to a greater ability to identify possible fraudulent activity.

Algorithmic Assignation of Numerical Values Indicative of Fraudulent Activity

Taken in its entirely, a strict comparison of registrant data would present an overwhelming amount of information, an obstacle to the agency whose primary responsible is the efficient distribution of aid. To benefit from a data comparison, the automated comparison would include gradational algorithm that assigns a numerical value to each individual comparison of datum. This "Eligibility Algorithm" would be a consistent ranking source that would equalize applicants' needs, information, and historical data.

The eligibility algorithm would be set so that data conflicts more likely to be associated with fraudulent activity, such as duplicate social security numbers, receive a higher numerical score than data that is not particularly indicative of fraud, such as multiple instances of a common name.

In short, every time the algorithm compares two pieces of data, it will determine whether there is a conflict. If the system determines that there is a conflict, the algorithm will assign a numerical score to that particular conflict in the applicant's file; a score that is proportional to the likelihood of fraud indicated by that particular conflict. As noted above, a social security number conflict may be considered more indicative of fraudulent activity than multiple

instances of a common name. For that reason, the algorithm would assign a higher numerical value to a social security number conflict than it would a name conflict. A comparison that does not result in a conflict would not receive any numerical score.

Ideally, the algorithm would be even more precise; with a numerical value range for each conflict. The assigned score for every conflict within a particular conflict type would depend on the severity of the conflict. For example, a social security number check might reveal that the applicant provided a different last name than what is on file with the Social Security Administration, but the rest of the provided information is an exact match. Another aid applicant's social security number check, however, might reveal a completely different name and date of birth. Taking into consideration the probability that the first person is less of a risk factor for fraud that the second person, the first conflict would receive a lower numerical score from the algorithm.

For the purposes of illustration, an agency may assign the algorithm a range of 40 to 60 for all social security number conflicts. While the algorithm would assign the applicant a numerical score of 45 in the first example, it would assign a numerical score of 60 for the second example, indicative of a higher propensity for fraud inherent in the second example. A numerical score of 40 would be reserved for registrant names that have a single character difference than the Social Security Administration, which reflects the possibility of a typographical error rather than the intentional submission of fraudulent information.

Using the Aggregate Numerical Scores in the Review of Aid Applications

Ultimately, each application for aid will receive an aggregate numerical value that should be proportional to the probability that the application contains fraudulent information. The aid agency would than institute a leveling system by which applications are handled differently depending on the range of their numerical score. For illustrative purposes, an agency may determine that every application with a total aggregate score of less than 50 will be approved without further review, applications scoring between 50 and 100 will require additional identification verification (such as the submission of a government issued identification card or its equivalent), and applications scoring over 100 will require both additional documentation and an in-person interview at an aid application field office. Additional divisions are, of course, possible according to the agency's individual evaluation of risk factors.

The separation of applications by aggregate score range serves the aid agency by allowing a productive division of labor. Volunteers may be quite capable of handling approvable aid applications, for instance, while professional employees are required to handle applications with a high aggregate score. Additionally, employees are more likely to specialize in a particular area, such as the review of "high risk" applications, when they are responsible only for reviewing that particular area. This division of applications would also make post-disaster reviews easier, as there is going to be proportionally more fraud in applications in the highest aggregate scoring range than in lower ranges.

Illustration 2 (below) shows the placement of the eligibility algorithm at the output point of existing data structures providing an overall eligibility score. What is important to note is that the security level indicators can be set low to high for various data sets, acknowledging a time for low security and rapid dissemination of benefits.

Illustration 2 – Eligibility Algorithm
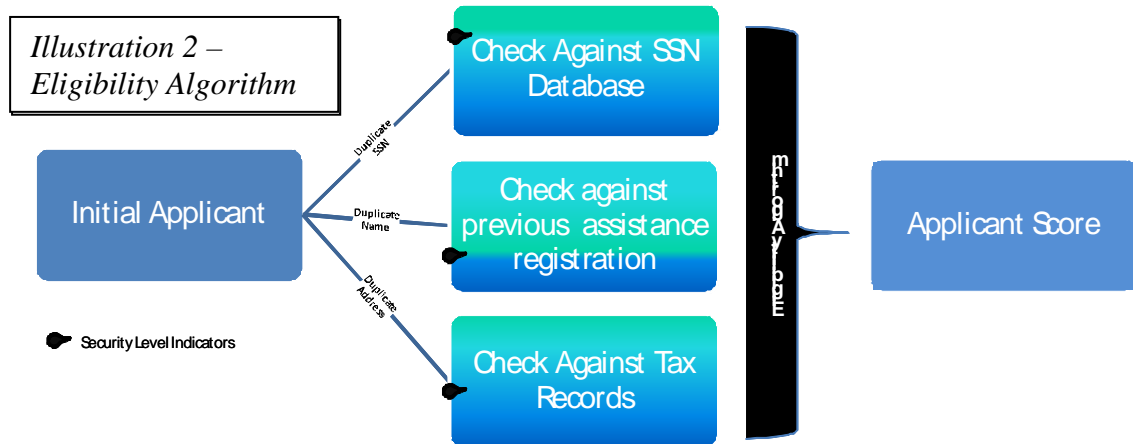
Once implemented, the agency's response to the numerical scoring system is infinitely adaptable. Should a future study determine, for example, that incidents of fraud with significant financial impact are statistically rare during the first seven days following a disaster, the agency can alter their response to applications that fall within the established numerical scoring ranges to accommodate that information.

Implementing Comparative Reviews Prior to and During Aid Dissemination

Resource tracking during disaster recovery operations is a monumental task. To assist with reducing the receipt of duplicate benefits to disaster victims, the role of algorithmic review of comparative data should not end after the aid application process. Rather, it should be routinely reapplied in limited form, with less emphasis on identity confirmation than on duplicate aid disbursement recognition.

Upon the approval of each application, the database system should query previous entries associated with the applicant or with algorithmically identified potential applicant aliases. This information should be cross-referenced before aid is disbursed. For instance, the comparative functionality of the system would automatically check to see if someone of a certain name (or with a similar name) or at a certain address previously received aid that would exclude the aid currently being considered. For example, the system would recognize that a person could not receive rental assistance because they were currently being provided with free housing, or that multiple people could not receive repairs assistance for the same address. Essentially, this utilization of a comparative review will be an aid recipient tracking system that would draw on data from the current and previous disasters to prevent duplicate aid payments.

Anticipated Cost versus Benefits

While the integration of various government databases, development and implementation of an appropriate agency response plan to numerical score ranges, and training of employees to provide varying levels of scrutiny to applications for aid is not anticipated to be an inexpensive venture, the long-term savings promise to be significant. Taking into consideration the unfortunate certainty that disasters will continue to occur and the equal truism that unscrupulous people will seek to take advantage of financial aid offered to victims of those disasters, applying a comprehensive fraud prevention strategy would allow an agency reduce the fiscal resources that are fraudulently redirected from legitimate recipients.

Summary

Disaster assistance provided in a timely manner to mitigate victim stress is always the upmost priority. In 2006, FEMA modified their assistance procedures with the Expedited Assistance (EA) program, which distributed pre-paid debit cards, electronic fund transfers, and checks in the amount of $2000 to affected households (GAO, 2006). In retrospect, "FEMA made duplicate EA payments to about 5,000 of the nearly 11,000 debit card recipients" (GAO, 2006). In addition, FEMA found that the debit cards were used for adult entertainment, bail bond services, and weapons purchases – none of which are considered essential needs in a post-disaster environment.

Given the available technology and possible integration of databases into a fused, algorithmic system, there is no reason that disaster victims cannot be serviced quickly, equitably, and in a fraud-free environment. Preventing front end fraudulent behavior will ultimately be more cost effective, and consumer beneficial than the current efforts underway to re-coup inappropriate disbursements through litigation. To date, no number has been provided regarding the overall cost and effort to recoup these costs, but litigation is still underway to recoup monies illegally obtained in the 2006 season.

Further research should examine the links of various existing networks to set up a paradigm in which an eligibility algorithm could work. Other exploration could be made into pre-loading existing data into this framework for a given area; tax rolls, property records, state and federal assistance programs, and even school systems to prevent the duplicate use of children as dependants.

Aid systems are intended to facilitate the rapid deployment of available assets to mitigate a disaster's impact. The position of the victim and the position of the relief agency are ideally not in conflict. The question relief agencies must balance is the immediate need when compared to the ability to provide future need. If the ability to provide future need is compromised by a system with failures, then the system failures must be addressed.

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