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# Disaster Kit Contents: A Comparison of Published Guidelines for Household Preparedness Supplies

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## Abstract

*This paper discusses the comprehensiveness and specificity of published guidelines for household disaster kits. A search was conducted via the Internet to identify disaster kit lists, which were then analyzed for major themes and types of contents. While the specificity of recommendations and the number of disaster kit items varied widely across the sampled lists, several key categories of contents were found in the majority of them. The immense variability across the sampled lists suggests that a "gold standard" is necessary for disaster kit guidelines in order to best aid the public in their preparedness efforts.*

**Keywords**: Disaster kit contents, emergency preparedness

## Introduction

The events of September 11, 2001 and Hurricane Katrina have resulted in heightened attention to emergency response and disaster planning in the United States. It is therefore crucial to reach the public with guidance on appropriate disaster planning and preparedness measures. Health-related information geared towards individuals and households has proliferated on the Internet, facilitating the increased accessibility of disaster preparedness guidelines to the public. Emphasis on households' ability to remain self-sufficient during a disaster has prompted the publication of guidelines and lists of disaster kits contents. However, just as the sources of such information can vary greatly, so too can the recommendations provided by each source. This study examines the

contents of 71 disaster kit guidelines/lists that were published on the Internet, drawing out common themes, deficiencies, and areas for consideration. Specifically, disaster kit lists were evaluated for their comprehensiveness (e.g., encompassing a wide or narrow array of supplies), and their specificity (e.g., providing vague or precise item recommendations).

## Background

### The Need for Disaster Kits

The need for individuals and households to be prepared for emergencies and disasters has been stated by government agencies and non-governmental organizations alike (FEMA 2004; NHC 2009; ARC 2009; SBA 2009; WHO 2007; CDC 2009; Louisiana 2009). Emergency assistance for the public may not be immediately available following a disaster, as seen in disaster response efforts in recent years (FEMA 2006). In the case of Hurricane Katrina, some Gulf Coast victims were unable to receive either rescue or aid for a week or more, a product both of inaccessibility to the areas, as well as a poor disaster response (Waugh 2006). While the public may want or expect immediate assistance, this is likely not to be the case. Due to the need to respond to potentially widespread impacts with limited resources, first responders and government agencies may not be able to immediately reach and provide services to all segments of disaster-affected populations, necessitating the need for self-sufficiency for a least a minimum period of time (FEMA 2004). Therefore, households are encouraged to prepare their own supplies by assembling disaster kits.

While the recommended duration for self-sufficiency varies from anywhere between 72 hours to one week depending on the information source, government disaster plans often rely on households' ability to remain self-sufficient for at least several days (FEMA 2004; Mack et al. 2006). It has been recommended that individuals provide for their own food, water, first aid, shelter, and sanitation needs. Further, those with special needs, such as diabetes and chronic illness, are encouraged to establish their own preparedness measures, such as family emergency plans and tailored disaster kits/supplies (Stallwood 2006). In addition to meeting daily physical needs, household preparedness can also bestow benefits by reducing people's "fear, anxiety, and losses that accompany disasters" (FEMA 2004).

### Low Levels of Preparedness

Despite the occurrence of large-scale domestic and international events, such as wildfires in Southern California, flooding in the Midwestern United States, and most

recently, the devastating earthquake in Haiti, disaster preparedness levels are extremely low. According to a 2007 American Public Health Association poll, while less than half of the public had disaster kits in general, only 14% of Americans have "adequate" disaster supplies (food, water, medication) (Late 2007). The Federal Emergency Management Agency's Citizen Corps' 2009 national survey assessed individuals' preparedness, finding that 56% of respondents indicated having disaster supplies in their home. While food and water were commonly mentioned by respondents as being part of their disaster supplies (77% and 71% respectively), items such as medications (11%), cash (1%), financial documents (1%), and even eyeglasses (0%) were far less common (FEMA 2009). In addition, the Citizen Corps' findings include differences in actual and perceived preparedness, indicating that individuals may actually be less prepared than they believe (FEMA 2007).

**Teaching Preparedness**

Individual, community and institutional factors have been cited as reasons for low disaster preparedness. Individual-level barriers may include a lack of hazard awareness, knowledge, and/or resources to perform preparedness actions (Glik 2007). Tierney, Lindell, and Perry found a relationship between increased preparedness and hazard awareness. Those who are aware of and educated about potential local hazards may be more likely than those who are unaware to have disaster plans and supplies. Yet, even when the public is aware of potential hazards, they may still lack the knowledge or resources with which to initiate preparedness activities (Tierney, Lindell and Perry 2001). Furthermore, Nathe et al. state that personal traits, such socioeconomic, demographic, and cultural factors may influence individuals' use of and adherence to hazard information (Nathe et al. 1999).

In order for the public to become aware of hazards and knowledgeable about potential preparedness actions to mitigate risk, mass communication campaigns are often employed from the community and institutional levels. However, to be effective, credible sources of information must provide clear and consistent messaging (US DHHS 2002). For example, Tierney et al. emphasize the importance of perceived risk, credible information sources, and frequently-repeated information across multiple channels (2001). Similarly, Nathe et al. state that non-technical terms, multiple, credible information sources and consistent information across different media are important for disaster education (1999). In addition, public education campaigns should foster thought and discussion of one's environment and the potential effect of disasters, further encouraging information seeking from experts and credible sources. The authors also emphasize the role of guidance from professionals, as "without these blueprints, people can fall prey to a fatalistic inertia" (Nathe et al. 1999). That is, without specific, yet

comprehensible information to follow, the public may fail to take preparedness actions, even if they are aware of potential hazards. Mishra and Suar (2007) have shown the importance of behavior change guidelines, and that those who were provided with education on hazards were significantly more likely to be prepared for floods and heat waves.

**Published Disaster Preparedness Information**

In order to reach the public with guidance on appropriate disaster planning and preparedness measures, various public and private sources have produced guidelines for disaster supplies and "disaster kits." This information, which has primarily been geared towards individuals and households, has become increasingly accessible through multiple channels, especially via the Internet. However, inconsistencies in preparedness information have arisen due to differential messaging from the various sources and channels from which information can be obtained. Lack of consensus and conflicting information have been cited among the impediments to risk communication, and thus preparedness efforts (Tierney et al. 2001).

In the case of disaster kit guidelines, inconsistencies result from variations in comprehensiveness and specificity. Comprehensiveness hinges on the breadth of the recommended supply categories, such as the inclusion of basic "essentials" like food, water, and sanitation. The lack of any of these categories, as well as an inadequate number of supplies within these categories, may reduce comprehensiveness. Specificity issues arise with the level of detail provided for the recommended disaster kit supplies and for how long such kits should last. For example, recommendations may have high specificity by explicitly stating exact quantities and types of supply items (e.g., "one dozen two-inch bandages"), or lack specificity by including only general descriptions (e.g., "first aid kit" or "food"). Inconsistencies across recommendations also arise through varying durations for self-sufficiency (e.g., ranging from 72 hours to one week), or these durations may be ambiguous, using terms like "at least several days," or missing entirely (FEMA 2004; Mack et al. 2006).

**Study Aim**

Surprisingly, little peer-reviewed literature has been published on the topic of household disaster supplies or "disaster kit" contents. Literature exists that examines, analyzes, and compares various aspects of disaster planning, including organization-level disaster planning, such as hospital patient care supplies, staffing issues, and communication (Auf der Heide 1996**;** Krajewski, Sztanjkrycer, and Baez 2005**;** Quarantelli 1985). However, literature that analyzes the contents of home disaster kits or

compares recommendations for supplies was not found. For this reason, this study was conducted to examine existing guidelines for disaster kits across a variety of Internet-accessible sources. The contents of 71 disaster kit guidelines were analyzed to assess the comprehensiveness and specificity of the recommendations, as well as the overall consistency between recommendations.

## Method

A literature review was conducted using the PubMed, CINAHL, PsychInfo, Global Health, PAIS International, and National Guideline Clearinghouse databases in order to identify extant research relevant to disaster kits. These sources were chosen to allow for a more comprehensive search, as each covers a slightly different range of information. Queries were performed using researcher-selected keywords, as well as descriptors found in the databases' thesauruses (e.g., Medical Subject Headings, or "MeSH" terms for PubMed.gov). Specific search terms included "disaster," "emergencies," "supply/supplies," "equipment," "emergency kit," "emergency supply," and "emergency preparedness," among others.

An Internet search was then conducted via Google.com (Google Inc., 2009) utilizing the terms "disaster kit" and "disaster preparedness kit" in order to locate guidelines from both public and private sources. Google.com was used due to its popularity and status as the single-most utilized search engine (Experian Hitwise 2010). The use of a search engine, and *not* a directed effort to particular agencies or websites, was conducted to replicate the way in which a member of the public might approach the search for information on disaster kits, i.e. to simply type that query into Google.com.

Commercially-available disaster kits were not evaluated due to this study's focus on guidelines and lists for supplies that individuals and households could acquire and assemble themselves. Initially, 96 guidelines/lists were compiled from these searches, which were then narrowed down to focus only on those disaster kits intended for individuals and households. Those that focused specifically on workplace kits, child kits, and/or pet kits were eliminated for consistency. This resulted in 71 lists that were then analyzed for their disaster kit contents. It should be noted that more than one distinct disaster kit/supplies list may exist for the same source organization, and each list has been analyzed individually in this study.

An Excel spreadsheet (Microsoft Corporation 2003) was created to organize the information obtained from each list to calculate descriptive statistics and assess their comprehensiveness and specificity. Comprehensiveness was measured through both the range of recommendation types as well as the number of items mentioned. A list/guideline with a large number of items is not necessarily comprehensive in nature; rather, those that include items across a range of important categories, as well as having

enough items to help guide the user, are considered "comprehensive." Specificity was measured qualitatively through precise descriptions (e.g., lengths, amounts, size, and material) of the item recommendations.

Based on preexisting divisions within the lists and logical connections between items, the following categories were utilized for item classification: 1) Water, 2) Food, 3) First Aid, 4) Hygiene, 5) Clothing, 6) Household Items, 7) Tools, 8) Special Needs, and 9) Financial/Family Documents. As stated, these groups resulted in part from an examination of the various disaster kit lists, and in part due to their representing relatively distinct and recognizable categories of goods, in addition to following existing research on basic health needs. Food, water, and hygiene are all crucial concerns for human health following disasters and are each represented by corresponding supply categories (Noji 1997). Similarly, first aid items may be used to treat any injuries sustained during or following a disaster, while clothing is important for maintaining proper body temperatures, particularly in cold climates (SPHERE 2004). Household items and tools may be of great use if the household can shelter-in-place and needs to conduct any maintenance or repairs to the site. While many types of disaster supplies are appropriate for the population in general (i.e. "basic needs" supplies), certain items or groups of items are specifically for sub-populations, or "special needs" groups, such as infants, the elderly, or the infirm; therefore, there is a separate category for such supplies.

Disaster kit items from the sampled websites were entered into the appropriate categories and analyzed by the type of item and frequency of appearance. Descriptive statistics were calculated using Excel for all variables in this analysis. With each frequency distribution, measures of central tendency (mean, median and mode) and dispersion (range and standard deviation) were obtained. Means were compared between groups using an independent sample t-test (verified via an analysis of variance test). Due to the sample size, an alpha level of 0.05 was used to determine statistical significance.

## Results

The sources of the 71 disaster kit lists can be broken down into two overarching categories: public sector (43) and private sector (28). The former is comprised of multiple levels of government (ranging from city governments to federal agencies) and public educational entities, while the latter includes seven branches of the American Red Cross, news sites, non-profit organizations, and corporate entities (see Table 1).

Overall, there was great disparity in the number of items included in the disaster kit lists, ranging from 11 to 221 recommendations per list ($M$ = 61.6; $SD$ = 40.8). Several short examples (12 to 14 item recommendations) and one extended example (120 item recommendations) are included in Table 2 and Table 3. More specifically, disaster kit guidelines from public sector sources ranged from 11 to 149 items, with an average of $M$

= 63.9 (*SD* = 36.0), while those from private sector sources ranged from 11 to 221 items, with an average of *M* = 56.8 (*SD* = 47.4). There was no statistically significant difference between the means of the public and private sector disaster kit lists ($t = .672$, $p = .325$, $df = 69$).

**Table 1. Sample**

| Organization | Number of Items |
|---|---|
| **Public** | |
| City of San Mateo, CA | 149 |
| North Carolina Cooperative Extension | 137 |
| City of New Haven, CT | 109 |
| US Department of Energy | 106 |
| City of Ann Arbor, MI | 100 |
| Putnam County, FL | 98 |
| City of Austin, TX | 97 |
| Federal Citizen Information Center, Pueblo, CO | 95 |
| San Luis Obispo Office of Emergency Services | 94 |
| City of Renton | 93 |
| Pennsylvania Emergency Management Agency | 92 |
| Federal Citizen Information Center, Pueblo, CO | 91 |
| NC Cooperative Extension | 90 |
| Ready Illinois | 90 |
| Arkansas Department of Emergency Management | 89 |
| Montana Department of Military Affairs | 88 |
| Louisiana Homeland Security & Emergency Preparedness | 88 |
| Federal Emergency Management Agency | 87 |
| City of Brownsville, TX | 80 |
| University of Illinois Extension | 77 |
| Commonwealth of Massachusetts | 62 |
| Federal Emergency Management Agency | 62 |
| San Francisco Department of Emergency Management | 60 |
| West Virginia University | 57 |
| Bergen County Office of Emergency Management | 55 |
| Katy Area Chamber of Commerce | 51 |
| Jefferson Parish, LA | 49 |
| Texas Extension Disaster Education Network | 39 |
| American Academy of Pediatrics | 38 |
| Hinds County Department of Emergency Management | 35 |
| NOAA National Weather Service | 34 |
| Florida Division of Emergency Management | 33 |
| Texas Extension Disaster Education Network | 33 |

**Table 1. Sample (continued)**

| | |
|---|---|
| **Public** (continued) | |
| National Hurricane Center | 29 |
| Federal Emergency Management Agency | 25 |
| Edmonton Police Service | 25 |
| Sarasota County Government Online | 24 |
| Arizona 2-1-1 Program | 23 |
| Hawaii State Civil Defense | 16 |
| City of Monterey, CA Fire Department | 12 |
| City of San Antonio, TX | 12 |
| Boston Public Health Commission | 12 |
| Virginia Department of Emergency Management | 11 |
| **Private** | |
| Equipped to Survive | 221 |
| American Red Cross - prepare.org | 135 |
| American Red Cross - San Diego/Imperial Counties Chapter | 109 |
| WTNH.com News Channel 8 | 94 |
| American Red Cross of Los Angeles, CA | 89 |
| American Red Cross - San Diego/Imperial Counties Chapter | 86 |
| InsWeb Learning Center | 83 |
| Vanderbilt University Wellness Resource Center | 82 |
| ASIS International | 82 |
| American Red Cross - Portland, OR | 80 |
| American Red Cross - Seattle Area, WA | 78 |
| AllBusiness.com | 53 |
| NSF International | 53 |
| Equipped to Survive | 51 |
| American Red Cross of Susquehanna Valley | 34 |
| Broadmoor Improvement Association | 32 |
| Cornell University | 27 |
| Cornell University | 25 |
| Neighborhood Link | 23 |
| Orcas Power & Light Cooperative | 23 |
| Magellan Health Services | 23 |
| Simi Valley Hospital | 23 |
| National Fire Protection Agency | 18 |
| CNN | 16 |
| Boy Scouts of America | 14 |
| Central United States Earthquake Consortium | 14 |
| Factmonster | 12 |
| State Farm Insurance | 11 |

There was also significant variation in the level of specificity of the recommendations. Some lists simply included broad descriptions, such as “food,” “clothing,” and “first aid kit,” while others listed exact quantities for specific items within those larger categories. Examples of specific items include “peanut butter and jelly,”

"three rolls of two-inch roller bandages," "18-hour hand and body warmers," or "ABC home fire extinguisher."

The study's findings are detailed below, broken out by the overarching categories mentioned above, and specific frequencies are listed in Table 4.

**Table 2: Brief Disaster Kit List Examples**

| Example 1 | Example 2 | Example 3 |
|---|---|---|
| Drinking water | Bottled water | Water - 3 days |
| Food | Food (no cooking required) | Food - 3 days |
| First-aid kit | First aid kit | Food that does not need to be heated or cooked |
| Over-the-counter and prescription medications | Several days supply of any prescribed medicine | First aid supplies (aspirin, prescription medication, band aids, etc.) |
| Tent or other means of protection from the elements | Extra clothing | Change of clothing for everyone in your household |
| Sleeping bag/heavy blankets | Walking shoes | Sleeping bag or blanket for each person |
| Signal flare | Gloves | Flashlight |
| Disinfectant/bleach | Blanket | Personal hygiene products |
| Toilet paper/personal hygiene items | Flashlight and extra batteries | Battery-powered radio/TV |
| Fire extinguisher | Toilet tissue | Whistle |
| Pet food | Handy wipes | Tools like screwdrivers and hammers |
| Pocket knife | Portable radio with extra batteries | Pet supplies such as toys and food |
| | Emergency contact information | Essential documents like power of attorney, birth and marriage certificates, insurance policies, and a copy of your will |
| | $2.00 in quarters for telephone | Special needs items for any member of your household (for example, infant formula or items for persons with disabilities) |

## Water

Every list in the sample mentioned water in varying amounts. Eighty percent of the disaster kit lists recommended one gallon per day, with the majority (77.2%) of the one gallon recommendations citing a duration of three days, and the remainder (22.8%) ranging from five to fourteen days. One list cited two gallons per day for three to seven days, while four lists cited three gallons per day (one list at 14 days, three lists of unspecified duration). Other proposed water amounts included two quarts for three days, and five to seven gallons per day (unspecified duration). A number of lists did not

provide a specific amount of water, but merely indicated the need for water for a certain duration (three days, three to seven days). In addition, a large proportion of the disaster kit lists recommended water purification items of some kind. Over 60 percent of the lists included household chlorine bleach, roughly 10% included water purification tablets, and over 5 percent included water purification kits or agents.

**Food**

Nearly all (94.4%) of the disaster kit lists in the sample contained food-related recommendations, by providing either general information or specific items. Over two-thirds of the sample recommended having enough food for three days. However, the entire range for food recommendations was three to fourteen days. Canned meat/fruit/vegetables were mentioned in over half of the sample, followed by canned or powdered juice/milk/soup, high energy foods such as peanut butter, granola bars, trail mix, and infant/elderly/special needs foods. Vitamins, comfort foods (e.g., sweets, coffee, tea), salt/pepper/sugar, and non-perishable food/ready-to-eat meals were also mentioned with regularity.

The most common non-food item was a non-electric can opener, followed by mess kits or disposable cups/plates/utensils, aluminum foil, plastic storage containers, and a grill/stove with fuel. Kitchen accessories/cooking utensils and resealing plastic bags were listed in a minority of the sample.

**Table 3: Extensive Disaster Kit List Example**

| | | | |
|---|---|---|---|
| 2-inch sterile gauze pads (4-6) | Denture supplies | Items for service animals/pets | Rubbing alcohol |
| 2-inch sterile roller bandages (3 rolls) | Dialysis equipment | Latex gloves (2 pairs) | Sanitary supplies |
| 3-inch sterile roller bandages (3 rolls) | Diapers/wipes | Leash/harness | Scissors |
| 4-inch sterile gauze pads (4-6) | Disability-related supplies and special equipment | Litter/pan | Shutoff wrench to turn off household gas/water |
| Activated charcoal | Disinfectant | Manual | Signal flare |
| Additional water | Disposable dust masks | Map of the area for locating shelters | Soap, liquid detergent |
| Adhesive labels | Dressing devices | Matches in a waterproof container | Sterile adhesive bandages in assorted sizes |
| Adhesive tape | Eating utensils | Medications and medical records | Sturdy shoes or work boots |
| Aluminum foil | Entertainment | Medicine dropper | Suction equipment |
| Antacid | Extra eye glasses | Mess kits or paper cups; plates and plastic utensils | Sunglasses |

**Table 3: Extensive Disaster Kit List Example (continued)**

| | | | |
|---|---|---|---|
| Anti-diarrheal medication | Extra water | Moistened towelettes | Sunscreen |
| Antiseptic | Facial tissues | Needles, thread | Syrup of Ipecac |
| Aspirin or non-aspirin pain reliever | Family records (birth, marriage, death certificates) | Nonelectric can opener, utility knife | Tape (e.g., duct tape) |
| Assorted sizes of safety pins | Feminine hygiene supplies | Nonprescription drugs | Thermal underwear |
| Battery-operated radio and extra batteries | Flashlight and extra batteries | One complete change of clothing and footwear per person | Thermometer |
| Blankets/sleeping bags | Food - 3 days | Oxygen | Toilet paper, towelettes |
| Bottles | Formula | Paper, pencil | Tongue blades (2) |
| Cane(s) | Games and books | Patch kit and can of seal-in-air | Triangular bandages (3) |
| Canned fruits, dried fruits and nuts | Glasses | Personal hygiene items | Tube of petroleum jelly or other lubricant |
| Canned vegetables | Grooming utensils | Plastic bucket with lid | Tweezers |
| Cash or traveler's checks, coins | Hat and gloves | Plastic garbage bags, ties (for personal sanitation uses) | Urinary supplies |
| Cleansing agent/soap | Hearing device | Plastic sheeting | Vaccinations and medical records |
| Collar | Heart and high blood pressure medication | Plastic storage containers | Videocassettes |
| Compass | Heavy cotton of hemp rope | Pliers, screwdriver, hammer, crowbar, assorted nails, wood screws | Walker |
| Contact lenses and supplies | Heavy work gloves | Powdered formula, milk or baby food | Water - 3 days - 1 gal/person/day |
| Copy of passports, Social Security cards, immunization records | Household chlorine bleach | Prescription drugs | Wheelchair |
| Copy of Supplemental Security Income award letter | Identification tags | Rain gear | Wheelchair repair kit |
| Copy of will, insurance policies, contracts, deeds, stocks, bonds | Important family documents | Ready-to-eat canned meats | Whistle |
| Crutches | Insulin | Record of bank account numbers, names and phone numbers | Writing devices |
| Dentures | Inventory of valuable household goods, important telephone numbers | Record of credit card accounts | |

## First Aid

At least one-third (33.8%) of the sampled lists included first aid items in some form. Prescription drugs were included in more than 90% of the kit lists, and over half of the sample contained other first aid items such as cleansing/disinfectant agents, adhesive bandages, sterile gloves, and pain reliever. Other common items included a thermometer, scissors, tweezers, first aid kit, anti-diarrhea medication, antacid, laxatives, safety pins, medicine dropper, petroleum jelly, Syrup of Ipecac, sunscreen, and activated charcoal.

**Table 4: Select Disaster Kit Recommendations, Frequencies**

| Item | Frequency within Sampled Lists* |
|---|---|
| **Water and Water Treatment** | 100.0% |
| One gallon per person per day | 80.0% |
| 3 days | 62.0% |
| 3-7 days | 4.2% |
| 5 days | 1.4% |
| 14 days | 1.4% |
| Two gallons per person (3-7 days) | 1.4% |
| Three gallons per person | 5.6% |
| Two quarts (3 days) | 1.4% |
| Five to seven gallons per person | 2.8% |
| Chlorine bleach | 62.0% |
| Water purification tablets | 9.9% |
| Water purification kits / agents | 5.6% |
| | |
| **Food and Accessories** | 94.4% |
| Food | |
| 3 days | 67.6% |
| 3-7 days | 7.0% |
| 5 days | 1.4% |
| 7 days | 2.8% |
| 14 days | 4.2% |
| Unspecified | 9.9% |
| Canned meat / fruit / vegetables | 60.6% |
| Canned / powdered juice / milk / soup | 52.1% |
| High energy foods (e.g., peanut butter, trail mix) | 52.1% |
| Infant/elderly/special needs foods | 50.7% |
| Vitamins | 45.1% |
| Comfort foods (e.g., sweets, tea) | 43.7% |
| Salt / pepper / sugar | 40.8% |
| Non-perishable / ready-to-eat meals | 36.6% |
| Non-electric can opener | 81.7% |
| Mess kits / disposable cups / plates / utensils | 62.0% |

**Table 4: Select Disaster Kit Recommendations, Frequencies (continued)**

| Item | Frequency within Sampled Lists* |
|---|---|
| **Food and Accessories (continued)** | |
| Aluminum foil | 46.5% |
| Plastic storage containers | 32.4% |
| Grill / stove with fuel | 22.5% |
| Kitchen accessories / utensils | 12.7% |
| Resealing plastic bags | 12.7% |
| | |
| **First Aid** | |
| Prescription drugs | 91.5% |
| Cleansing / disinfectant agents | 64.8% |
| Adhesive bandages | 60.6% |
| Sterile gloves | 54.9% |
| Pain reliever | 56.3% |
| Thermometer | 46.5% |
| Scissors | 49.3% |
| Tweezers | 47.9% |
| Anti-diarrhea medication | 47.9% |
| Antacid | 47.9% |
| First aid kit | 45.1% |
| Laxatives | 40.8% |
| Safety pins | 40.8% |
| Medicine dropper | 39.4% |
| Petroleum jelly | 39.4% |
| Syrup of Ipecac | 38.0% |
| Sunscreen | 38.0% |
| Activated charcoal | 33.8% |
| | |
| **Hygiene** | |
| Toilet paper | 73.2% |
| Plastic garbage bags | 67.6% |
| Moist towelettes | 63.4% |
| "Personal hygiene items" | 59.2% |
| Feminine supplies | 56.3% |
| Plastic bucket with tight lid | 49.3% |
| Plastic bag ties | 46.7% |
| Toothbrush and toothpaste | 21.1% |
| Deodorant | 12.7% |
| | |
| **Tools** | |
| Whistle | 67.6% |
| Tape / duct tape | 63.4% |
| Utility / pocket knife | 59.2% |
| Adjustable wrench / stuf-off wrench | 59.2% |
| Pliers | 54.9% |

**Table 4: Select Disaster Kit Recommendations, Frequencies (continued)**

| Item | Frequency within Sampled Lists* |
|---|---|
| **Tools (continued)** | |
| ABC-style fire extinguisher | 50.7% |
| Compass | 42.3% |
| Shovel | 22.5% |
| Hammer | 16.9% |
| Screwdriver | 12.7% |
| Nails | 11.3% |
| Crow / pry bar | 11.3% |
| | |
| **Household** | |
| Portable battery / hand-crank NOAA radio | 95.8% |
| Flashlight | 91.5% |
| Blankets or sleeping bags | 88.7% |
| Matches (windproof / waterproof or in water-proof container) | 73.2% |
| Entertainment materials for children (games, books, toys, dolls) | 63.4% |
| Extra batteries | 62.0% |
| Paper and pens / pencils | 57.7% |
| Soap / detergent | 56.3% |
| Needle and thread | 53.5% |
| Plastic sheeting | 52.1% |
| Tent | 46.5% |
| Keys / extra keys | 33.8% |
| Pillows | 12.7% |
| | |
| **Special Needs** | |
| Special items for babies / children | 69.0% |
| Special items for adults | 28.2% |
| Special items for the elderly | 14.1% |
| Special items for the disabled | 19.7% |
| Special items for pets | 19.7% |
| Formula / powdered milk | 60.6% |
| Diapers | 60.6% |
| Eye glasses | 50.7% |
| Baby bottles | 50.7% |
| Contact lenses and supplies | 42.3% |
| Denture supplies | 36.6% |
| Insulin | 31.0% |
| Heart / blood pressure medication | 29.6% |
| | |
| **Personal Finance / Documents** | |
| Cash, credit cards, traveler's checks, change / coins | 80.3% |
| Driver's license, photo identification, passports | 64.8% |
| Wills, insurance policies, contracts, deeds, stocks / bonds | 63.4% |
| Maps | 62.0% |

**Table 4: Select Disaster Kit Recommendations, Frequencies (continued)**

| Item | Frequency within Sampled Lists* |
|---|---|
| **Personal Finance / Documents** | |
| List of important telephone numbers | 52.1% |
| Social Security card | 49.3% |
| Immunization records | 49.3% |
| Inventory of household / valuable goods | 47.9% |
| Bank documents / account numbers | 46.5% |
| Credit card account numbers, photocopies of identification / credit cards | 46.5% |
| Family records (birth, marriage, death certificates) | 46.5% |
| **Clothing** | |
| Hat, gloves, scarf | 76.1% |
| Sturdy shoes / work boots | 70.4% |
| Complete change of clothes / footwear | 64.8% |
| Thermal underwear | 56.3% |
| Sunglasses | 54.9% |
| Rain gear | 53.5% |

* Frequency of item mentioned in sampled disaster kit lists divided by the total number of disaster kit lists (71)

## Hygiene

Between 12.7 percent and 73.2 percent of the sample included various types of personal hygiene items. Of these items, toilet paper, plastic garbage bags and moist towelettes were listed the most often. “Personal hygiene items” and feminine supplies were also common. In addition, nearly half of the sample included a plastic bucket (with a tight lid) and plastic bag ties for use with plastic bags (above) as a portable toilet/commode. A minority of lists included a toothbrush and toothpaste or deodorant.

## Clothing

Over half (53.5%) of the sample included clothing. More than three-quarters of kit lists included a hat, gloves, and scarf, followed by sturdy shoes/work boots, and a complete change of clothes/footwear for each person. In addition, more than half of the sources listed thermal underwear, sunglasses, and rain gear.

## Tools

Between 11.3 percent and 67.6 percent of the sample included various tool items. Commonly-mentioned tools included a whistle, tape/duct tape, utility/pocket knife,

adjustable wrench/shut-off wrench, pliers, fire extinguisher, and a compass. Less frequently-mentioned items included a shovel, screwdriver(s), hammer, nails, and crow/pry bar.

**Household**

Between 12.7 percent and 95.8 percent of the sample contained household items. Portable battery/hand-crank (NOAA) radios and flashlights were each mentioned in over 90 percent of the sample. Other common household items included matches (water/windproof or in waterproof container), entertainment materials for children (e.g., games, books/reading material, toys/dolls), extra batteries, paper and pencils/pens, soap/detergent, needle and thread, and keys/extra keys. Bedding-specific items included blankets or sleeping bags, plastic sheeting, a tent, and pillows.

**Special Needs**

Items for "special needs" populations were included in 29.6 percent to 69.0 percent of the sample. Special items for babies/children were identified in over two-thirds of the sample, while those for adults and the elderly were found in roughly one-quarter or less. In order of frequency, the most common special needs items included formula/powdered milk, diapers, eye glasses, baby bottles, contact lenses and supplies, denture supplies, insulin, and heart/blood pressure medication. Special items for the disabled and pets were also identified in roughly one-fifth of the sample.

**Financial/Family Documents**

Between 46.5 percent and 80.3 percent of the sample included items relating to household finance and vital family documents. More than three-quarters of the disaster kit lists included money in some form, such as cash, credit cards, traveler's checks, and change/coins. Meanwhile, more than half of the sample listed the following document types: 1) driver's license, personal/photo identification, photocopy of ID, passports, 2) wills, insurance policies, contracts, deeds, stocks and bonds, 3) maps, and 4) a list of important telephone numbers. Nearly half of the sample included Social Security cards and immunization records, an inventory of household/valuable goods, bank documents/account numbers, credit card account numbers and photocopies of identification/credit cards, and family records (birth, marriage, death certificates).

## Discussion

Overall, the sampled disaster kit lists varied considerably in comprehensiveness and specificity. With regard to the former, there was variation in both the type and number of recommended items. However, the most frequently-mentioned disaster kit contents represented many of the most crucial post-disaster needs, including food, water, first aid, hygiene, and warmth (clothing and bedding). These essential items were complemented with household items (kitchen supplies and tools), special needs items, and important documents. Although the same types of essentials were generally covered across the kit guidelines, there were differences in the number of items included. Some lists contained only basic information and relatively few items, while others were very extensive (e.g., over 200 recommended items). Disaster kit lists that include far too many items may leave end-users overwhelmed and feeling obligated to purchase everything, which in turn may discourage them from acting at all. However, supplies lists with too few items may result in a public that is ill-prepared, or lack items that are customized to users' individual needs. If the individuals or households were to refer to multiple sources for their disaster kit lists, the discontinuity between the large and small number of items in the guidelines may lead to ambiguity or confusion, which may impede the public from taking any action at all (Tierney 2000).

In addition to the type and number (i.e. comprehensiveness) of items included in the guidelines, the level of specificity varied as well. While some lists contained specific quantities for individual kit items (e.g., two 2-3" gauze rolls, 24 cotton balls, four pair of latex gloves), others simply included general terms such as "first aid kits." One advantage of highly-detailed and specific disaster kit lists is that it can reduce uncertainty and preclude the public from having to guess what types of goods are appropriate as food or medical supplies. A potential challenge exists in trying to prevent the public from feeling overwhelmed by the task of having to purchase very specific goods that may be rarely used. In the case of medical supplies, published guidelines could supplement lengthy lists with an option for pre-assembled first aid kits, such as those available at retail outlets or online.

### Public versus Private Sources

The American public may turn to government agencies in particular when searching for disaster preparedness information because they are sources with whom households may already be familiar. Source familiarity and source credibility have been noted as factors contributing to increased action to health messages (Sorenson 2000). The lists provided by government agencies and public educational institutions in this sample were fairly lengthy and detailed in nature (see Table 1). However, the data also indicates that

the private sector sources had a similar overall range number of items and that the means of the two groups were not statistically different. As such, individuals and households seeking disaster kit information from either group may find that on average there is no difference in the number of items and receive similar results. These results may be encouraging by providing a consistent message across diverse sources and channels.

**Consistency**

While this study examined only a sample of disaster kit guidelines, it is clear that inconsistency remains a persistent issue for lists available on the Internet. Message specificity and consistency have been found to aid the effectiveness of risk communication and warning responses (Sorenson 2000; Mileti and Sorenson 1990; Windahl, Signitizer, and Olson 1992; Glik 2007). Conversely, the lack of consensus and conflicting information has been cited among the impediments to risk communication, and thus preparedness efforts (Tierney et al. 2001). As Wood et al. note, inconsistent messages, despite any individual utility, can ultimately serve to confuse users (2009). Although it can be seen as a positive that the examined disaster kits were readily-available for those with Internet access, the sample did suffer from a lack of consistency. Users could be easily confused upon comparing a 12-item list and a 100-item list, uncertain what contents to include, resulting in an incomplete disaster kit or having taken no action at all.

**A Gold Standard**

The need for a "gold standard" household disaster kit guideline is crucial, and thus one needs to be formally developed. The purpose of the "gold standard" would be to provide minimum requirements for disaster kit contents, such as X gallons of water per day for Y days. The gold standard recommendations should be based on recognized human health and safety requirements, such as those detailed in the SPHERE Project (2004). Although this would not entirely eliminate the variability seen across different sources' disaster kit lists, as some parties may recommend additional supplies above and beyond the gold standard, it would at least ensure minimum health needs.

In addition to the types of supplies included, the cost of assembling the kit must also be considered when designing the gold standard guideline. Financial limitations may prohibit households from purchasing a long list of items, or items that are especially expensive. Low-income households may not be able to divert money that is needed for daily survival to items for a disaster kit (Tierney 1993). Therefore, cost and convenience must be taken into account when developing a gold standard kit that is feasible, appropriate, and attainable for all households' disaster preparedness.

Although the Department of Homeland Security, the Federal Emergency Management Agency, and the American Red Cross have each published disaster kit guidelines, such lists are not necessarily cited or used as templates. A cooperative effort, such as national campaigns by these and other local, state, and federal agencies may be necessary to disseminate this information and ensure that the myriad existing guidelines conform to the gold standard once it is established.

**Additional Considerations**

While portability was not specifically addressed in this study, the issue requires attention by developers of disaster kit guidelines. If households are required to evacuate their premises, it may prove difficult or impossible to transport large disaster kits. Websites providing kit guidelines may do best to provide a more extensive list for home supplies, as well as a truncated, bare-essentials list for portable kits (i.e. "go bags" that can be carried or transported easily). Similarly, methods of storage were not examined, but are highly relevant for disaster kit creation and maintenance. Literature pertaining to proper food and water storage does exist, such as the use of plastic or metal containers to be placed in a cool, dry place (FEMA, 2004; Lala and Lala 2006). However, households may not be aware of such information or have knowledge on how to best store their disaster supplies so that they are readily accessible, yet non-obtrusive in daily life. Further, the size of the kit must be considered for households that may not have ample storage space to stow a kit. Those residing in densely-populated areas or apartment living may have limited storage space, without a basement or attic to store a large and bulky kit, which can create additional barriers to assembling disaster kits.

Creators of disaster supplies guidelines should also consider including instructional information regarding the purchase of the kit items. Acquiring all of the disaster kit items at one time may prove to be prohibitively expensive for some households and may discourage the public from constructing such kits at all. Tips on staggering purchases and building the kits incrementally over time may help encourage or persuade households to begin building their disaster supplies.

While universal guidelines may be helpful for reaching the largest number of households, kit customization deserves special attention. Although the "gold standard" disaster kit guideline should be kit suitable for all hazards facing the American public, akin to "all-hazard" disaster plans, additional considerations may be taken into account to build upon the "basic" kit to help create more tailored solutions. For example, the geographic location of households will necessitate different items based on hazards that are common for that region. Snow and hurricane-relevant items should be included in kits for the eastern states, while earthquake-specific tools and supplies are more appropriate for western states. Similarly, disaster kit customization should also incorporate cultural

considerations, such as guidelines for non-English speaking populations or kits that include culturally-relevant food items (Glik 2007). Similarly, those with restricted income may require additional assistance in creating their kits, including how and where they may acquire the necessary items (Mack et al. 2006).

In addition to the specific sources of information, special attention should also be paid to the medium through which disaster kit guidelines are provided. The disaster kit guidelines evaluated in this study were all hosted on the Internet, and the availability of hard-copy lists was not examined. Although more than 80% of Americans had some form of Internet access in 2006, it is still not ubiquitous in American homes (US Census 2008). Similarly, literature shows that race/ethnicity and socioeconomic status may influence preference for certain media for obtaining information, with some groups preferring broadcast media, while others prefer print (Nathe et al. 1999; Kumanyika and Grier 2006). In order to reach all audiences, varying formats and sources should be employed. Similar to the US Geological Survey's (USGS) efforts in the 1990s, disaster kit information may be included as free booklets inside of common print media, such as Sunday newspapers (Nathe et al. 1999). Lessons learned from health promotion messaging and risk communication should be incorporated in the dissemination of these guidelines, utilizing multiple media and outlets through which to reach the public.

## Conclusion

As Cheh, Ribisl, and Wildemuth (2003) note regarding Internet-based smoking cessation information, health information should follow evidence-based guidelines. In the case of disaster kits, guidelines do exist but the variability in kit contents and lack of a "gold standard" may prove to be a source of confusion for the public. Some households may look to well-known agencies or government sites for guidance, while others may seek grassroots websites for disaster kit content recommendations; however, these two sets of resources may provide varying or even conflicting results. It is crucial to note the sizeable differences in recommended items for a disaster kit – some sites listed multiple pages of necessary items, while others listed few items other than food and water. When confronted with such vastly different lists, individuals may opt for those with fewer requirements in order to decrease cost, time, and effort needed to put a disaster kit together. A potential danger in such a scenario is that abbreviated kit lists may leave households poorly prepared for an actual disaster.

Currently, little to no literature exists on the contents of household disaster kits or supplies. This study serves as a brief investigation into published disaster kit guidelines, but it is only a start. Further work should be done to incorporate additional sources, including commercial sites geared towards selling survival and disaster supplies. Similarly, the cost of supplies should also be evaluated, both in terms of their

affordability to various population subgroups, as well as a comparison of pre-assembled kits versus those assembled by end-users.

This study issues the following recommendations regarding disaster kit guidelines. First, a "gold standard" kit needs to be developed through rigorous research, considering both item efficacy and factors such as household income, awareness, and motivation. Second, the guidelines should continue to be published and distributed via credible sources, such as multiple levels of government and relevant public agencies. News media and non-governmental organizations should provide links to these published guidelines, rather than perpetuating potential confusion by distributing vague or incomplete lists of their own. Third, multiple forms of media should be used in order to reach the largest number of households.

More research is necessary to decipher the public's perception about assembling home disaster kits. Which types of lists are more helpful? Are detailed, thorough lists too overwhelming? Are general kits that offer more flexibility too vague? Which websites does the public look to for guidance on disaster kits? Which entities are seen as the most credible and are consulted the most often for disaster information? Further research into these areas may help reveal the most effective and appropriate home disaster kits for households, encouraging more families to assemble a kit, and therefore enabling them to be better prepared in an emergency or disaster situation.

A potential limitation in this study may arise from a sampling problem in the search queries for the disaster kit lists. Alternative search terms to those used in the study, or a greater number of query permutations, may have yielded additional kit lists, which could have contributed to the scope and depth of the disaster kit supplies examined.

In addition, the identified disaster kit items (Table 4) do not represent all of those mentioned in the sampled lists. Items mentioned only once or relatively infrequently were not included due to the study's aim of identifying common themes and categories among disaster kit guidelines/lists. Future research in a more recently-collected sample may incorporate these less frequently-mentioned items and assess their utility and inclusion as disaster kit contents.

Another limitation is the timeframe of the study. Information available on the Internet can be perishable, as content may change or sites cease to exist over time. Some websites are moved or removed entirely, while others may not be maintained and the information becomes outdated. Therefore, it is not possible to have a representative sample of the information available to the public at all times. However, this could be addressed through the creation of a single "gold standard." Not only would a single standard provide consistency, but as recommendations change, it may be far more feasible to update the "gold standard" to which households and organizations may refer. An additional limitation is that this study did not attempt to create such a "gold standard" kit. Rather, it

demonstrates the lack of consensus of online resources and the need for a single, standardized approach.

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