# National survey of children's hospital based safety resource centers

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# National survey of children's hospital based safety resource centers

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## ABSTRACT

### OBJECTIVE

To describe the location, staffing, clientele, safety product disbursement patterns, education provided and sustainability of Safety Resource Centers (SRCs) in United States (U.S.) children's hospitals.

### METHODS

A cross-sectional survey was distributed to children's hospital-based SRC directors. Survey categories included: funding sources, customer base, items sold, items given away, education provided, and directors' needs.

### RESULTS

32/38 (84%) SRC sites (affiliated with 30 hospitals) completed the survey. SRCs were in many hospital locations including: lobby (28%), family resource centers (13%), gift shop/retail space (18%), mobile units (19%), and patient clinics (13%). 19% of respondents reported that their SRC was financially self-sustainable. Sales to patients predominated (mean of 44%); however hospital employees made up a mean of 20% (range 0-60%) of sales. 78% of SRCs had products for children with special health care needs. Documentation kept at SRC sites included: items purchased (97%), items given away (66%), and customer demographics (50%). 56% of SRCs provided formal IP education classes. The SRCs' directors' most important needs were: finances (47%), staffing (50%), and space (47%). 100% of directors were 'somewhat interested' or 'very interested' in each of the following: creation of a common SRC list serve, national SRC data bank and multi-site SRC research platform.

### CONCLUSIONS

SRCs are located in many US children's hospitals, and can be characterized as heterogeneous in location, products sold, data kept, and ability to be financially sustained. Further research is needed to determine best practices for SRCs to maximize their impact on injury prevention.

Strengths and limitations of this study

- This study is the first to describe the function and variability of children's hospital based safety resource centers in the United States (US)
- Safety resource centers are located in many US children's hospitals, and vary in terms of center settings, products sold, data kept, and ability to be financially sustained
- While the response rate to the survey was high, it is an overall small sample of safety resource centers and does not reflect the activities of those not based in children's hospitals

## BACKGROUND

Unintentional injury is the leading cause of morbidity and mortality in children greater than 1 year of age.[1] It is estimated that 14 million children will sustain an injury which will require medical attention each year, and a significant number of these children will have permanent disability.[2] Several strategies have been used to mitigate these preventable injuries, including education to families about safety practices and use of proven products, development of new safety equipment, and legislation to mandate behaviors.

There is evidence that the combination of education and increased accessibility of safety equipment increases safety knowledge and behavior, ultimately making children at less risk for future injury. [3 4] One Emergency Department (ED) based study revealed that the combination of free home safety equipment and home safety information was effective in improving knowledge and use of home safety devices at a 2 month follow up. [4] Another ED study found that the combination of a booster seat with car safety education was more effective than just education alone.[5] In fact, 98% of families that received a booster seat with education utilized the seat at follow-up, while only 5% of families who received education alone used a booster seat. Finding innovative ways to provide safety education and offer products free or at reduced cost is key to injury prevention.

Children's hospitals that provide medical, surgical, and psychiatric care are typically located within urban communities. Because injuries tend to disproportionately affect socioeconomically disadvantaged and non-white children who often live in these

communities[6], these institutions service a demographically diverse group including children at high risk for potential injury.[7] As a result, being able to provide prevention education, services, and products within these children's hospitals can be a key component to preventing injuries to children in the future. Gittelman and colleagues have previously described the use of a Safety Resource Center (SRC) located in the ED of a large, tertiary care children's hospital in an urban setting. [3 8] They found that 97% of customers contacted in follow-up were still using items they purchased at the SRC, and over one quarter of customers made a change in home safety behaviors after their visit. 75% of customers who made a purchase did not have previous knowledge of the SRC prior to their visit. [8]

There are currently 38 known SRCs affiliated with 30 children's hospitals. Each SRC is located in its unique setting (eg. ED, gift shop, primary care clinic, etc). The U.S. Children's Hospital Association is a voluntary institutional membership organization representing 217 children's hospitals in the U.S. Conservatively, this membership represents approximately 87% of all eligible children's hospitals and pediatric units that exist in The Children's Hospital Association has been supportive of these centers and has historically offered funding to facilitate development of SRCs as well as peer learning and networking among centers. The Children's Hospital Association continues to maintain a comprehensive and current list of these centers and their directors/contacts.

SRCs help provide families with discounted product and enhanced education about safety that many clinicians may not have the time or resources to provide. Despite their recent

growth and evidence of success, no study has assessed the state and function of SRCs located in children's hospitals in the United States. The objective of this study was to describe the location, staffing, clientele, safety product disbursement patterns, education provided and sustainability of Safety Resource Centers (SRCs) in United States children's hospitals.

## METHODS

### Study Design

This was a confidential, cross-sectional survey of children's hospital based safety resource centers. The survey was developed by the authors, and edited after receiving feedback from an individual who had experience with SRCs but was not eligible to complete the survey. Consent was implied by completion of the survey. The Children's Hospital of Philadelphia institutional review board reviewed the protocol and deemed this study to be exempt from human subjects research.

### Study Setting & Population

Directors of children's hospital based SRCs, or their appropriate managers, were identified by the Children's Hospital Association. Those identified as most knowledgeable about the SRC at each hospital were provided advanced notice of the survey via e-mail notification. The SRC representative was then invited to participate via an e-mail request from the Children's Hospital Association. If the children's hospital was known to have multiple SRCs, the primary contact at that hospital either completed

multiple surveys (one for each SRC), or distributed the survey to other colleagues more knowledgeable about their specific SRC.

**Study Protocol**

The electronic survey was designed, and data collected and managed using Research Electronic Data Capture (REDCap) software,[9] a secure, web-based application designed to support data collection for research studies. The Children's Hospital Association emailed a cover letter that introduced the study and included a generic web address link to the REDCap questionnaire to all SRC contacts between September and October of 2012. (The survey is available upon request).

After the initial email, three e-mail reminders were sent to non-respondents over a five week period. No compensation was offered for participation.

**Measurements**

The survey included multiple choice questions with space for additional answers. Survey categories included: funding sources, customer base, items sold, items given away, education provided (including 'formal' (ie, targeted, in-person instruction) and 'informal' (ie, written materials and other passive education)), follow up performed and perceived barriers to managing the SRC.

**Data Analysis**

Survey results were analyzed using Stata (Version 10.0, StataCorp, College Station, TX). Descriptive statistics were used to summarize variables, using means to summarize continuous variables.

## RESULTS

Thirty–two of thirty eight sites (84.2%) affiliated with thirty children's hospitals completed surveys. All sites were established within the last 8 years; the majority (38%) originated in the past 3 to 4 years. Hours of operation vary widely with 5 (15.6%) sites open for >40 hours, 12 (37.5%) open from 30 to 40 hours, 8 (25%) from 20 to 29 hours, and 7 (21.9%) open less than 20 hours per week. Almost all of the sites are open during business hours 31 (96.9%), with only 14 (43.8%) open in evenings and 12 (37.5%) open on weekends. The distribution of customer demographics is in Table 1.

**Table 1** Distribution of Safety Center customer demographics (N=32)

| | Mean | SD |
|---|---|---|
| Patients | 44% | ±30 |
| Community members | 34% | ±32 |
| Employees | 20% | ±18 |

Table 2 demonstrates the distribution of locations where SRCs operate within the children's hospital setting. The SRCs are most commonly located in the hospital lobby (9, 28%) and least commonly found in the emergency department (1, 3%).

**Table 2** Distribution of Safety Resource Center Site Locations (N=32)

| SRC Location | % |
|---|---|
| Hospital Lobby | 28 |

| | |
|---|---|
| Retail space | 18 |
| Mobile Unit | 19 |
| Family Center | 13 |
| Clinic | 13 |
| Free Standing | 6 |
| ED | 3 |

SRCs offer a variety of products and services within children's hospitals. Twenty-three sites (72%) carry discounted safety products (even further discounted from their base wholesale prices), and 25 sites (78%) offer products for children with special health care needs. Thirty-one sites (97%) provide informal education in the form of pamphlets or other handouts for equipment sold, however slightly more than half 18 (56%) provide formal injury prevention education and 9 (28%) provide follow-up with families after a purchase is made at the SRC. The purpose of follow-up varies, including assessing customer satisfaction, use of products, and disseminating information on product recalls. The majority of sites keep records on items sold (97%) and items given away (66%), however only16 sites (50%) keep records on customer demographics. Table 3 lists the products sold and products given free of charge by most SRCs.

**Table 3** Products Distributed by Safety Resource Centers (N=32)

| Product | Available for sale (%) | Available for free distribution (%) |
|---|---|---|
| Stove shield | 69 | 16 |
| Bicycle helmet | 59 | 41 |
| Cabinet/drawer lock | 59 | 28 |
| Window cord wind-up | 59 | 22 |

| | | |
|---|---|---|
| Carbon monoxide detector | 56 | 16 |
| Baby gate | 53 | 22 |
| Combination car seat | 53 | 38 |
| Convertible car seat | 53 | 41 |
| Home child proofing kit | 53 | 41 |
| Backless booster seat | 50 | 38 |
| High back booster seat | 50 | 41 |
| Smoke alarm | 50 | 28 |
| Gun lock | 13 | 41 |
| Infant car seat | 44 | 34 |

SRC staffing also varies, with 0-6 paid staff and 0-9+ unpaid volunteers. Nineteen sites (59%) require Child Passenger Safety (CPS) certification, and 20 (63%) require other informal training for their paid staff. Six sites (19%) require other types of formal training for staff, and 2 sites (6%) require no training. Fewer sites require training for their volunteer staff: 3 (9%) CPS certification and formal curricular training, 9 (28%) informal training, and 3 (9%) no training.

Sites are primarily funded by grants and hospital support. (Figure 1) Twelve sites (38%) report an annual gross income between $5,000 and $10,000 dollars, with the remainder reporting an income range of $10,000 to $50,000. Respondents reported barriers and needs in management of the SRC, with 16 sites (50%) identifying staffing issues, 15 (47%) lack of funds, 15 (47%) storage space, and 12 (38%) lack of time as significant barriers. All respondents were interested in future collaboration through utilizing a

listserv to share information electronically with other SRCs, a national data bank of all SRCs, as well as collaborative research.

## DISCUSSION

This is the first study to describe the state and function of United States children's hospital-based SRCs. These results show that SRCs vary widely in the way they function, their clientele, and in the services and products provided. They are defined as centers which provide discounted or free injury prevention equipment in addition to injury prevention education to families;[8] however in this study we found that only half of SRCs offer formal, hands-on injury prevention education. Studies have shown that the combination of equipment with formal education is the best strategy for increasing proper use of injury prevention equipment.[4 5] Our findings did confirm that informal education in the form of pamphlets and written materials is provided with many purchases. Future studies should determine which approach should be advocated as SRC best practice.

Prior descriptions of SRCs have focused on single institutions, without a comparison across various locations or a description of the customers served.[8 10] This study has identified that the customer demographics across SRCs vary widely, and has confirmed findings identified in a previous analysis that employees make up a significant percentage of customers in some sites.[11]

The barriers to managing SRCs identified consistently by sites included staffing issues, lack of storage space, and lack of time, all of which are at least partially influenced by

funding issues. This is supported by the fact that only 19% of SRCs identified as self-sustainable, an issue which has been previously discussed in the literature.[3] This study did not explicitly ask about the business model for the SRCs or ask respondents to indicate if the center was established with the intention of being self-sustaining. However, it does appear that many SRC directors feel that the only way to become truly self-sustainable would be to increase equipment prices, which is directly opposite the goal of making IP equipment more accessible to lower income, high risk families.

Novel ways will need to be investigated to make SRCs sustainable, if not self-sustainable. One possibility is to leverage the fact that a large percentage of some SRC's customers are hospital employees. Previous studies in the business literature have shown that employee wellness programs may have a return on their investment of six to one.[12] A novel funding and advertising idea for SRCs is to market themselves as part of employee wellness programs, as the benefit of injury prevention to the children of employees may provide significant benefits as do other aspects of the program. Income derived from purchases from employees may help offset costs to provide injury prevention equipment to other more disadvantaged groups. Studies have shown that injuries tend to disproportionately affect socioeconomically disadvantaged and non-white children, possibly related to lack of culturally appropriate education, language barriers, and socioeconomic status socioeconomic status.[6 13] The urban communities surrounding many children's hospitals are those in which many of these families live. The presence of SRCs in these communities, supported by their local children's hospital, is one

important way the significant morbidity and mortality due to unintentional injury can be addressed.

This study did have some limitations. The survey was limited to children's hospital SRCs identified by the Children's Hospital Association, and although we believe that the majority of SRCs are children's hospital based, these data may not be generalizable to SRCs that are not affiliated with children's hospitals. The survey was completed by the director of each SRC, and therefore based on their recollection and understanding of the function of the site, possibly introducing recall bias. Although the survey did include a few open-ended questions, it was not predominately qualitative, and fine details may not have been identified. Finally, the survey was confidential but not anonymous, which may have biased responses.

## CONCLUSIONS

Children's hospital based SRCs vary widely in the way they function, their clientele, and in the services and products provided. They have similar challenges, most of which are related to funding and sustainability. The issues of sustainability may be addressed by increased financial support for SRCs by the children's hospitals which host them, especially due to the significant benefit to the children in the communities the hospitals serve, as well as the children of hospital employees. This study is suggestive of one possible standardized best practice model of an SRC that utilizes volunteer staff, has consistent hospital and/or grant funding, and provides formal hands-on education in

addition to discounted IP equipment. Future collaborative research will help to confirm best practices for location, staffing, and funding at sites, as well as ways to improve the income and sustainability of SRCs.

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**Contributors** SK, MRZ, KSH, KBA and MAG designed the research; SK, MRZ, KSH, KBA, and MAG conducted the research; SK analysed the data; SK drafted the manuscript; SK, MRZ, KSH, KBA and MAG reviewed and approved the final manuscript; SK had primary responsibility for final content

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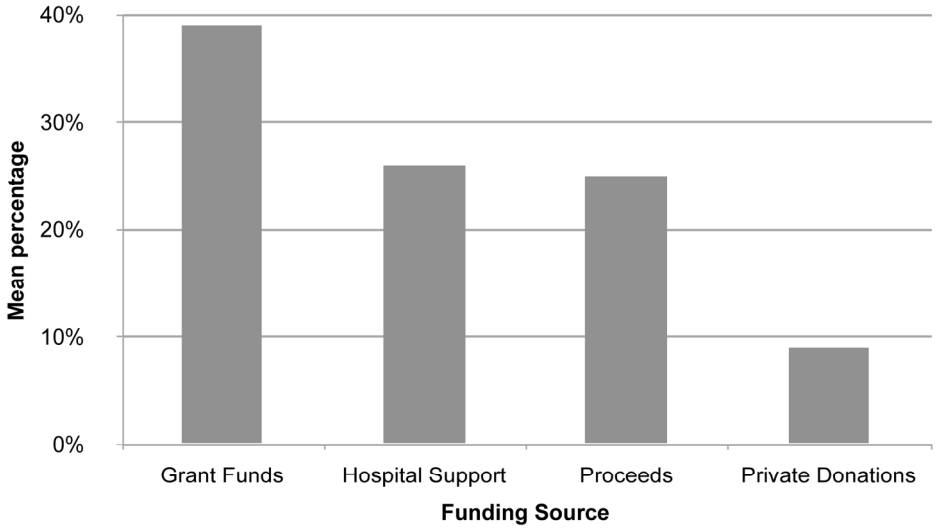


Distribution of funding sources for Safety Resource Centers
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## ABSTRACT

### OBJECTIVE

To describe the location, staffing, clientele, safety product disbursement patterns, education provided and sustainability of Safety Resource Centers (SRCs) in United States (U.S.) children's hospitals.

### METHODS

A cross-sectional survey was distributed to children's hospital-based SRC directors. Survey categories included: funding sources, customer base, items sold, items given free of charge, education provided, and directors' needs.

### RESULTS

32/38 (84%) SRC sites (affiliated with 30 hospitals) completed the survey. SRCs were in many hospital locations including: lobby (28%), family resource centers (13%), gift shop/retail space (18%), mobile units (19%), and patient clinics (13%). 19% of respondents reported that their SRC was financially self-sustainable. Sales to patients predominated (mean of 44%); however hospital employees made up a mean of 20% (range 0-60%) of sales. 78% of SRCs had products for children with special health care needs. Documentation kept at SRC sites included: items purchased (96.9%), items given free of charge (65.6%), and customer demographics (50.0%). 56.3% of SRCs provided formal injury prevention education classes. The SRCs' directors' most important needs were: finances (46.9%), staffing (50.0%), and space (46.9%). All of the directors were 'somewhat interested' or 'very interested' in each of the following: creation of a common SRC listserve, national SRC data bank and multi-site SRC research platform.

### CONCLUSIONS

SRCs are located in many US children's hospitals, and can be characterized as heterogeneous in location, products sold, data kept, and ability to be financially sustained. Further research is needed to determine best practices for SRCs to maximize their impact on injury prevention.

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## BACKGROUND

Unintentional injury is the leading cause of morbidity and mortality in children greater than 1 year of age.[1] It is estimated that 14 million children will sustain an injury which will require medical attention each year, and a significant number of these children will have permanent disability.[2] Several strategies have been used to mitigate these preventable injuries, including education to families about safety practices and use of proven products, development of new safety equipment, and legislation to mandate behaviors. Assessment of these various safety practices and policies have been assessed for various states and countries.[3 4]

There is evidence that the combination of education and increased accessibility of safety equipment increases safety knowledge and behavior, ultimately making children at less risk for future injury. [5 6] One Emergency Department (ED) based study revealed that the combination of free home safety equipment and home safety information was effective in improving knowledge and use of home safety devices at a 2 month follow up. [6] Another ED study found that the combination of a booster seat with car safety education was more effective than education alone.[7] Finding innovative ways to provide safety education and offer products free or at reduced cost is key to injury prevention.

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children at high risk for potential injury.[9] Gittelman and colleagues have previously described the use of a Safety Resource Center (SRC) located in the ED of a large, tertiary care children's hospital in an urban setting. [5 10] They found that 97% of customers contacted in follow-up were still using items they purchased at the SRC, and over one quarter of customers made a change in home safety behaviors after their visit. 75% of customers who made a purchase did not have previous knowledge of the SRC prior to their visit. [10]

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## METHODS

### Study Design

This was a confidential, cross-sectional survey of children's hospital based safety resource centers. The survey was developed by the authors, and edited after receiving feedback from an individual who had experience with SRCs but was not eligible to complete the survey. Consent was implied by completion of the survey. The Children's Hospital of Philadelphia institutional review board reviewed the protocol and deemed this study to be exempt from human subjects research.

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### Study Protocol

The electronic survey was designed, and data collected and managed using Research Electronic Data Capture (REDCap) software,[11] a secure, web-based application designed

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After the initial email, three e-mail reminders were sent to non-respondents over a five week period. No compensation was offered for participation.

**Measurements**

The survey included multiple choice questions with space for additional answers. Survey categories included: funding sources, customer base, items sold, items given free of charge, education provided (including 'formal' (ie, targeted, in-person instruction) and 'informal' (ie, written materials and other passive education)), follow up performed and perceived barriers to managing the SRC.

**Data Analysis**

Survey results were analyzed using Stata (Version 10.0, StataCorp, College Station, TX). Descriptive statistics were used to summarize variables, using means to summarize continuous variables.

**RESULTS**

Thirty–two of thirty eight sites (84.2%) affiliated with thirty children's hospitals completed surveys. All sites were established within the last 8 years; the majority

(37.5%) originated in the past 3 to 4 years. The distribution of the customer base is in Table 1.

**Table 1** Distribution of Safety Center customer base (N=32)

| | Median | Interquartile range |
|---|---|---|
| Patients | 40% | 22-70 |
| Community members | 22.5% | 10-60 |
| Employees | 15% | 2-28 |

Table 2 demonstrates the distribution of locations where SRCs operate within the children's hospital setting, and their hours of operation. The SRCs are most commonly located in the hospital lobby (9, 28%) and least commonly found in the emergency department (1, 3%). Almost all of the sites are open during business hours 31 (96.9%), with only 14 (43.8%) open in evenings and 12 (37.5%) open on weekends.

**Table 2** Distribution of Safety Resource Center Site Locations and Hours of Operation (N=32)

| SRC Characteristic | N | % |
|---|---|---|
| SRC Location | | |
| Hospital Lobby | 9 | 28.1 |
| Retail space | 6 | 18.8 |
| Mobile Unit | 6 | 18.8 |
| Family Center | 4 | 12.5 |
| Clinic | 4 | 12.5 |
| Free Standing | 2 | 6.2 |
| ED | 1 | 3.1 |
| Weekly hours of operation | | |
| >40 | 5 | 15.6 |
| 30-40 | 12 | 37.5 |
| 20-29 | 8 | 25.0 |
| <20 | 7 | 21.9 |

SRCs offer a variety of products and services within children's hospitals. Twenty-three sites (71.9%) carry discounted safety products (even further discounted from their base wholesale prices), and 25 sites (78.1%) offer products for children with special health care needs. Thirty-one sites (96.9%) provide informal education in the form of pamphlets or other handouts for equipment sold, however slightly more than half 18 (56.3%) provide formal injury prevention education and 9 (28.1%) provide follow-up with families after a purchase is made at the SRC. The purpose of follow-up varies, including assessing customer satisfaction, use of products, and disseminating information on product recalls. The majority of sites keep records on items sold (96.9%) and items given free of charge (65.6%), however only 16 sites (50.0%) keep records on customer demographics. Table 3 lists the products sold and products given free of charge by most SRCs. Some sites had identical products available for sale and available for free distribution.

**Table 3** Products Distributed by Safety Resource Centers (N=32)

| Product | Available for sale | | Available for free distribution | |
|---|---|---|---|---|
| | N | % | N | % |
| Stove shield | 22 | 68.8 | 5 | 15.6 |
| Bicycle helmet | 19 | 59.4 | 13 | 40.6 |
| Cabinet/drawer lock | 19 | 59.4 | 9 | 28.1 |
| Window cord wind-up | 19 | 59.4 | 7 | 21.9 |
| Carbon monoxide detector | 18 | 56.4 | 5 | 15.6 |

| | | | | |
|---|---|---|---|---|
| Baby gate | 17 | 53.1 | 7 | 21.9 |
| Combination car seat | 17 | 53.1 | 12 | 37.5 |
| Convertible car seat | 17 | 53.1 | 13 | 40.6 |
| Home child proofing kit | 17 | 53.1 | 13 | 40.6 |
| Backless booster seat | 16 | 50.0 | 12 | 37.5 |
| High back booster seat | 16 | 50.0 | 13 | 40.6 |
| Smoke alarm | 16 | 50.0 | 9 | 28.1 |
| Infant car seat | 14 | 43.1 | 11 | 34.4 |
| Gun lock | 4 | 12.5 | 13 | 40.6 |

SRC staffing also varies, with 0-6 paid staff and 0-9+ unpaid volunteers. Nineteen sites (59.4%) require Child Passenger Safety (CPS) certification, and 20 (62.5%) require other informal training for their paid staff. Six sites (18.8%) require other types of formal training for staff, and 2 sites (6.3%) require no training. Fewer sites require training for their volunteer staff: 3 (9.4%) CPS certification and formal curricular training, 9 (28.1%) informal training, and 3 (9.4%) no training.

Sites are primarily funded by grants and hospital support. (Figure 1) Twelve sites (37.5%) report an annual gross income between $5,000 and $10,000 dollars, with the remainder reporting an income range of $10,000 to $50,000. Only 18.8% of SRCs identified as being self-sustainable. Respondents reported barriers and needs in management of the SRC, with 16 sites (50.0%) identifying staffing issues, 15 (46.9%) lack of funds, 15 (46.9%) storage space, and 12 (37.5%) lack of time as significant barriers. All respondents were interested in future collaboration through utilizing a

listserv to share information electronically with other SRCs, a national data bank of all SRCs, as well as collaborative research.

## DISCUSSION

This is the first study to describe the state and function of United States children's hospital-based SRCs. These results show that SRCs vary widely in the way they function, their clientele, and in the services and products provided. SRCs are traditionally defined as centers which provide discounted or free injury prevention equipment in addition to injury prevention education to families.[10] However, this study found that only half of SRCs offer formal, hands-on injury prevention education. Prior work has shown that the combination of equipment with formal education is the best strategy for increasing proper use of injury prevention equipment.[6 7] The current practices of SRCs assessed in our study included the distribution of written education materials with many purchases. Future studies should determine identify and assess best practices for SRC activities.

Prior descriptions of SRCs have focused on single institutions, without a comparison across various locations or a description of the customers served.[10 12] This study has identified that the customer demographics across SRCs vary widely, and has confirmed findings identified in a previous analysis that employees comprise a significant percentage of customers in some sites.[13]

The barriers to managing SRCs identified consistently by sites included staffing issues, lack of storage space, and lack of time, all of which are influenced by funding. This is

supported by the fact that only 18.8% of SRCs identified as self-sustainable, an issue which has been previously discussed in the literature.[5] This study did not explicitly ask about the business model for the SRCs or ask respondents to indicate if the center was established with the intention of being self-sustaining. However, many SRC directors felt that the best way to become truly self-sustainable would be to increase equipment prices, which contrasts with the goal of making injury prevention equipment more accessible to lower income, high risk families. One possible strategy to increase the sustainability of SRCs is to leverage the fact that many customers are hospital employees. Previous studies in the business literature have shown that employee wellness programs are up to six times as profitable as the initial investment in such programs.[14] A novel funding and advertising idea for SRCs is to market themselves as part of employee wellness programs, as the benefit of injury prevention to the children of employees may provide significant benefits as do other aspects of the program. Income derived from purchases from employees may help offset costs to provide injury prevention equipment to other more disadvantaged groups. Studies have shown that injuries tend to disproportionately affect socioeconomically disadvantaged and non-white children, possibly related to lack of culturally appropriate education, language barriers, and socioeconomic status socioeconomic status.[8 15] The urban communities surrounding many children's hospitals are those in which many of these families live. The presence of SRCs in these communities, supported by their local children's hospital, is one important way to reduce the significant morbidity and mortality from unintentional injury.

This study did have some limitations. The survey was limited to children's hospital SRCs identified by the Children's Hospital Association, and therefore may not be generalizable to SRCs that are not affiliated with children's hospitals. The survey was completed by the director of each SRC, and therefore based on their recollection and understanding of the function of the site, possibly introducing recall bias. Although the survey did include a few open-ended questions, it was not predominately qualitative, and fine details may not have been identified. Additionally, the relative benefits of the various SRC interventions and the customers' use of the safety products was not measured. Finally, the survey was confidential but not anonymous, which may have biased responses.

## CONCLUSIONS

Children's hospital based SRCs vary widely in the way they function, their clientele, and in the services and products provided. They have similar challenges, most of which are related to funding and sustainability. The issues of sustainability may be addressed by increased financial support for SRCs by the children's hospitals which host them, especially due to the significant benefit to the children in the communities the hospitals serve, as well as the children of hospital employees. Future collaborative research will help to confirm best practices for location, staffing, and funding at sites, as well as ways to improve the income and sustainability of SRCs.

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**Competing interests** None

**Ethics approval** Exempt from review by Children's Hospital of Philadelphia institutional review board

**Data sharing statement** No additional data are available.

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National survey of children's hospital based safety resource centers

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**Keywords:** education, dissemination, advocacy, hospital care, safety center

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## ABSTRACT

### OBJECTIVE

To describe the location, staffing, clientele, safety product disbursement patterns, education provided and sustainability of Safety Resource Centers (SRCs) in United States (U.S.) children's hospitals.

### METHODS

A cross-sectional survey was distributed to children's hospital-based SRC directors. Survey categories included: funding sources, customer base, items sold, items given ~~away~~free of charge, education provided, and directors' needs.

### RESULTS

32/38 (84%) SRC sites (affiliated with 30 hospitals) completed the survey. SRCs were in many hospital locations including: lobby (28%), family resource centers (13%), gift shop/retail space (18%), mobile units (19%), and patient clinics (13%). 19% of respondents reported that their SRC was financially self-sustainable. Sales to patients predominated (mean of 44%); however hospital employees made up a mean of 20% (range 0-60%) of sales. 78% of SRCs had products for children with special health care needs. Documentation kept at SRC sites included: items purchased (96.97%), items given ~~away~~ free of charge (65.66%), and customer demographics (50.0%). 56.3% of SRCs provided formal ~~IP~~ injury prevention education classes. The SRCs' directors' most important needs were: finances (46.97%), staffing (50.0%), and space (46.97%). ~~100% of~~ All of the directors were 'somewhat interested' or 'very interested' in each of the following: creation of a common SRC list-serve, national SRC data bank and multi-site SRC research platform.

### CONCLUSIONS

SRCs are located in many US children's hospitals, and can be characterized as heterogeneous in location, products sold, data kept, and ability to be financially sustained. Further research is needed to determine best practices for SRCs to maximize their impact on injury prevention.

Strengths and limitations of this study

- This study is the first to describe the function and variability of children's hospital based safety resource centers in the United States (US)
- Safety resource centers are located in many US children's hospitals, and vary in terms of center settings, products sold, data kept, and ability to be financially sustained
- While the response rate to the survey was high, it is an overall small sample of safety resource centers and does not reflect the activities of those not based in children's hospitals

## BACKGROUND

Unintentional injury is the leading cause of morbidity and mortality in children greater than 1 year of age.[1] It is estimated that 14 million children will sustain an injury which will require medical attention each year, and a significant number of these children will have permanent disability.[2] Several strategies have been used to mitigate these preventable injuries, including education to families about safety practices and use of proven products, development of new safety equipment, and legislation to mandate behaviors. Assessment of these various safety practices and policies have been assessed for various states and countries.[3 4]

There is evidence that the combination of education and increased accessibility of safety equipment increases safety knowledge and behavior, ultimately making children at less risk for future injury. [5 6] One Emergency Department (ED) based study revealed that the combination of free home safety equipment and home safety information was effective in improving knowledge and use of home safety devices at a 2 month follow up. [6] Another ED study found that the combination of a booster seat with car safety education was more effective than ~~just~~ education alone.[7] ~~In fact, 98% of families that received a booster seat with education utilized the seat at follow up, while only 5% of families who received education alone used a booster seat.~~ Finding innovative ways to provide safety education and offer products free or at reduced cost is key to injury prevention.

Children's hospitals that provide medical, surgical, and psychiatric care are typically located within urban communities. Because injuries tend to disproportionately affect

socioeconomically disadvantaged and non-white children who often live in these communities[8], these institutions service a demographically diverse group including children at high risk for potential injury.[9] ~~As a result, being able to provide prevention education, services, and products within these children's hospitals can be a key component to preventing injuries to children in the future.~~ Gittelman and colleagues have previously described the use of a Safety Resource Center (SRC) located in the ED of a large, tertiary care children's hospital in an urban setting. [5 10] They found that 97% of customers contacted in follow-up were still using items they purchased at the SRC, and over one quarter of customers made a change in home safety behaviors after their visit. 75% of customers who made a purchase did not have previous knowledge of the SRC prior to their visit. [10]

There are currently 38 known SRCs affiliated with 30 children's hospitals. Each SRC is located in its unique setting (eg. ED, gift shop, primary care clinic, etc). The U.S. Children's Hospital Association is a voluntary institutional membership organization representing 217 children's hospitals in the U.S. Conservatively, this membership represents approximately 87% of all eligible children's hospitals and pediatric units that exist in The Children's Hospital Association~~-~~, who ~~has been supportive of these centers and has historically offered funding to facilitate development of SRCs as well as peer learning and networking among centers. The Children's Hospital Association continues to maintain~~ maintains a comprehensive and current list of these centers and their directors/contacts.

SRCs help provide families with discounted product and enhanced education about safety that many clinicians may not have the time or resources to provide. Despite their recent growth and evidence of success, no study has assessed the state and function of SRCs located in children's hospitals in the United States. The objective of this study was to describe the location, staffing, clientele, safety product disbursement patterns, education provided and sustainability of Safety Resource Centers (SRCs) in United States children's hospitals.

## METHODS

### Study Design

This was a confidential, cross-sectional survey of children's hospital based safety resource centers. The survey was developed by the authors, and edited after receiving feedback from an individual who had experience with SRCs but was not eligible to complete the survey. Consent was implied by completion of the survey. The Children's Hospital of Philadelphia institutional review board reviewed the protocol and deemed this study to be exempt from human subjects research.

### Study Setting & Population

Directors of children's hospital based SRCs, or their appropriate managers, were identified by the Children's Hospital Association. Those identified as most knowledgeable about the SRC at each hospital were provided advanced notice of the survey via e-mail notification. The SRC representative was then invited to participate via an e-mail request from the Children's Hospital Association. If the children's hospital was

known to have multiple SRCs, the primary contact at that hospital either completed multiple surveys (one for each SRC), or distributed the survey to other colleagues more knowledgeable about their specific SRC.

**Study Protocol**

The electronic survey was designed, and data collected and managed using Research Electronic Data Capture (REDCap) software,[11] a secure, web-based application designed to support data collection for research studies. The Children's Hospital Association emailed a cover letter that introduced the study and included a generic web address link to the REDCap questionnaire to all SRC contacts between September and October of 2012. (The survey is available upon request).

After the initial email, three e-mail reminders were sent to non-respondents over a five week period. No compensation was offered for participation.

**Measurements**

The survey included multiple choice questions with space for additional answers. Survey categories included: funding sources, customer base, items sold, items given ~~away~~free of charge, education provided (including 'formal' (ie, targeted, in-person instruction) and 'informal' (ie, written materials and other passive education)), follow up performed and perceived barriers to managing the SRC.

**Data Analysis**

Survey results were analyzed using Stata (Version 10.0, StataCorp, College Station, TX). Descriptive statistics were used to summarize variables, using means to summarize continuous variables.

**RESULTS**

Thirty–two of thirty eight sites (84.2%) affiliated with thirty children's hospitals completed surveys. All sites were established within the last 8 years; the majority (37.5%) originated in the past 3 to 4 years. ~~Hours of operation vary widely with 5 (15.6%) sites open for >40 hours, 12 (37.5%) open from 30 to 40 hours, 8 (25%) from 20 to 29 hours, and 7 (21.9%) open less than 20 hours per week. Almost all of the sites are open during business hours 31 (96.9%), with only 14 (43.8%) open in evenings and 12 (37.5%) open on weekends.~~ The distribution of the customer ~~demographics~~ base is in Table 1.

**Table 1** Distribution of Safety Center customer ~~demographics~~ base (N=32)

| | ~~Mean~~Median | ~~SD~~Interquartile range |
|---|---|---|
| Patients | 404% | ~~±30~~22-70 |
| Community members | 22.5~~34~~% | ~~±32~~10-60 |
| Employees | ~~20~~15% | ~~±18~~2-28 |

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Table 2 demonstrates the distribution of locations where SRCs operate within the children's hospital setting, and their hours of operation. The SRCs are most commonly located in the hospital lobby (9, 28%) and least commonly found in the emergency

department (1, 3%). Almost all of the sites are open during business hours 31 (96.9%), with only 14 (43.8%) open in evenings and 12 (37.5%) open on weekends.

**Table 2** Distribution of Safety Resource Center Site Locations and Hours of Operation (N=32)

| SRC Characteristic | N | % |
|---|---|---|
| SRC Location | | |
| Hospital Lobby | 9 | 28.1 |
| Retail space | 6 | 18.8 |
| Mobile Unit | 6 | 18.8 |
| Family Center | 4 | 12.5 |
| Clinic | 4 | 12.5 |
| Free Standing | 2 | 6.2 |
| ED | 1 | 3.1 |
| Weekly hours of operation | | |
| >40 | 5 | 15.6 |
| 30-40 | 12 | 37.5 |
| 20-29 | 8 | 25.0 |
| <20 | 7 | 21.9 |

SRCs offer a variety of products and services within children's hospitals. Twenty-three sites (71.9%) carry discounted safety products (even further discounted from their base wholesale prices), and 25 sites (78.1%) offer products for children with special health care needs. Thirty-one sites (96.9%) provide informal education in the form of pamphlets or other handouts for equipment sold, however slightly more than half 18 (56.3%) provide formal injury prevention education and 9 (28.1%) provide follow-up with families after a purchase is made at the SRC. The purpose of follow-up varies, including assessing customer satisfaction, use of products, and disseminating information on

product recalls. The majority of sites keep records on items sold (96.9%) and items given ~~away~~ free of charge (65.6%), however only 16 sites (50.0%) keep records on customer demographics. Table 3 lists the products sold and products given free of charge by most SRCs. Some sites had identical products available for sale and available for free distribution.

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## DISCUSSION

This is the first study to describe the state and function of United States children's hospital-based SRCs. These results show that SRCs vary widely in the way they function, their clientele, and in the services and products provided. ~~They~~ SRCs are traditionally defined as centers which provide discounted or free injury prevention equipment in addition to injury prevention education to families.[10] However, ~~in~~ this study ~~we~~ found

that only half of SRCs offer formal, hands-on injury prevention education. ~~Studies~~ Prior work has~~have~~ shown that the combination of equipment with formal education is the best strategy for increasing proper use of injury prevention equipment.[6 7] The current practices of SRCs assessed in our study included the distribution of ~~Our findings did confirm that informal education in the form of pamphlets and~~ written education materials ~~is provided~~ with many purchases. Future studies should determine ~~which~~ identify and assess best practices for SRC activities~~approach should be advocated as SRC best practice~~.

Prior descriptions of SRCs have focused on single institutions, without a comparison across various locations or a description of the customers served.[10 12] This study has identified that the customer demographics across SRCs vary widely, and has confirmed findings identified in a previous analysis that employees ~~make up~~comprise a significant percentage of customers in some sites.[13]

The barriers to managing SRCs identified consistently by sites included staffing issues, lack of storage space, and lack of time, all of which are ~~at least partially~~ influenced by funding ~~issues~~. This is supported by the fact that only 1~~8.89~~% of SRCs identified as self-sustainable, an issue which has been previously discussed in the literature.[5] This study did not explicitly ask about the business model for the SRCs or ask respondents to indicate if the center was established with the intention of being self-sustaining. However, ~~it does appear that~~ many SRC directors ~~feel~~ felt that the ~~only~~ best way to become truly self-sustainable would be to increase equipment prices, which ~~is directly~~

~~opposite~~ contrasts with the goal of making ~~IP~~ injury prevention equipment more accessible to lower income, high risk families.

~~Novel ways will need to be investigated to make SRCs sustainable, if not self-sustainable.~~ One ~~possibility~~ possible strategy to increase the sustainability of SRCs is to leverage the fact that many ~~a large percentage of some SRC's~~ customers are hospital employees. Previous studies in the business literature have shown that employee wellness programs are up to six times as profitable as the initial investment in such programs~~may have a return on their investment of six to one~~.[14] A novel funding and advertising idea for SRCs is to market themselves as part of employee wellness programs, as the benefit of injury prevention to the children of employees may provide significant benefits as do other aspects of the program. Income derived from purchases from employees may help offset costs to provide injury prevention equipment to other more disadvantaged groups. Studies have shown that injuries tend to disproportionately affect socioeconomically disadvantaged and non-white children, possibly related to lack of culturally appropriate education, language barriers, and socioeconomic status socioeconomic status.[8 15] The urban communities surrounding many children's hospitals are those in which many of these families live. The presence of SRCs in these communities, supported by their local children's hospital, is one important way ~~the~~ to reduce the significant morbidity and mortality ~~due to~~ from unintentional injury ~~can be addressed~~.

This study did have some limitations. The survey was limited to children's hospital SRCs identified by the Children's Hospital Association, and ~~although we believe that the majority of SRCs are children's hospital based, these data~~ therefore may not be generalizable to SRCs that are not affiliated with children's hospitals. The survey was completed by the director of each SRC, and therefore based on their recollection and understanding of the function of the site, possibly introducing recall bias. Although the survey did include a few open-ended questions, it was not predominately qualitative, and fine details may not have been identified. Additionally, the relative benefits of the various SRC interventions and the customers' use of the safety products was not measured. Finally, the survey was confidential but not anonymous, which may have biased responses.

## CONCLUSIONS

Children's hospital based SRCs vary widely in the way they function, their clientele, and in the services and products provided. They have similar challenges, most of which are related to funding and sustainability. The issues of sustainability may be addressed by increased financial support for SRCs by the children's hospitals which host them, especially due to the significant benefit to the children in the communities the hospitals serve, as well as the children of hospital employees. ~~This study is suggestive of one possible standardized best practice model of an SRC that utilizes volunteer staff, has consistent hospital and/or grant funding, and provides formal hands-on education in addition to discounted IP equipment.~~ Future collaborative research will help to confirm

best practices for location, staffing, and funding at sites, as well as ways to improve the income and sustainability of SRCs.

**Acknowledgements**: The authors would like to thank the safety resource center directors and administrators who participated in the study.

**Contributors** SK, MRZ, KSH, KBA and MAG designed the research; SK, MRZ, KSH, KBA, and MAG conducted the research; SK analysed the data; SK drafted the manuscript; SK, MRZ, KSH, KBA and MAG reviewed and approved the final manuscript; SK had primary responsibility for final content

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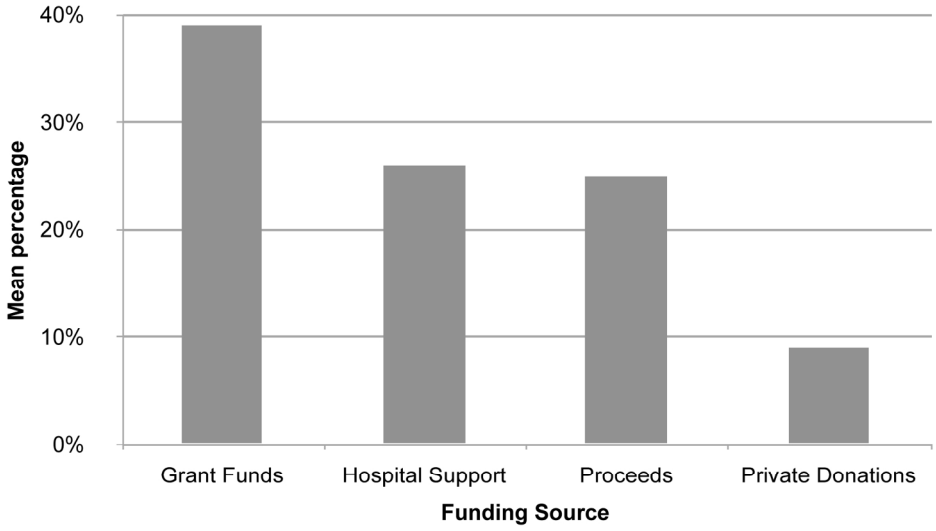


Distribution of funding sources for Safety Resource Centers
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