



National survey of children's hospital based safety resource centers

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004398
Article Type:	Research
Date Submitted by the Author:	02-Nov-2013
Complete List of Authors:	Kendi, Sadiqa; The Alpert Medical School of Brown University, Department of Emergency Medicine and Pediatrics Zonfrillo, Mark; The Childrens Hospital of Philadelphia, Center for Injury Research and Prevention, and Division of Emergency Medicine; Perelman School of Medicine, Department of Pediatrics Seaver Hill, Karen; Children's Hospital Association, Child Advocacy Department Arbogast, Kristy; The Childrens Hospital of Philadelphia, Center for Injury Research and Prevention, and Division of Emergency Medicine; Perelman School of Medicine, Department of Pediatrics Gittelman, Michael; Division of Emergency Medicine Comprehensive Children's Injury Center, Cincinnati Children's Hospital
Primary Subject Heading:	Paediatrics
Secondary Subject Heading:	Public health
Keywords:	education, advocacy, safety center

SCHOLARONE™
Manuscripts

only

1
2
3 National survey of children's hospital based safety resource centers
4
5

6 Sadiqa Kendi, MD¹, Mark R. Zonfrillo, MD, MSCE,^{2,3} Karen Seaver Hill⁴, Kristy B.
7 Arbogast, PhD^{2,3} Michael A. Gittelman, MD^{5,6}
8

9 ¹ Department of Emergency Medicine and Pediatrics, The Alpert Medical School of
10 Brown University, Providence, Rhode Island, USA
11

12 ² Division of Emergency Medicine and Center for Injury Research and Prevention, The
13 Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, USA
14

15 ³ Department of Pediatrics, Perelman School of Medicine, University of Pennsylvania,
16 Philadelphia, Pennsylvania, USA
17

18 ⁴ Children's Hospital Association, Alexandria, Virginia, USA
19

20 ⁵ Department of Clinical Pediatrics, University of Cincinnati School of Medicine,
21 Cincinnati, Ohio, USA
22

23 ⁶ Division of Emergency Medicine Comprehensive Children's Injury Center, Cincinnati
24 Children's Hospital, Cincinnati, Ohio, USA
25

26
27
28
29 **Keywords:** education, dissemination, advocacy, hospital care, safety center
30

31
32 **Address correspondence to:**

33 Mark R. Zonfrillo, MD, MSCE
34 Children's Hospital of Philadelphia
35 Division of Emergency Medicine
36 34th and Civic Center Boulevard
37 Philadelphia, PA 19104
38 Telephone: 267-426-0294
39 Fax: 215-590-5425
40 E-mail: zonfrillo@email.chop.edu
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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.

1
2
3
4
5
6 Strengths and limitations of this study
7

- 8
- 9 ■ This study is the first to describe the function and variability of children's hospital
10 based safety resource centers in the United States (US)
 - 11 ■ Safety resource centers are located in many US children's hospitals, and vary in terms
12 of center settings, products sold, data kept, and ability to be financially sustained
 - 13 ■ While the response rate to the survey was high, it is an overall small sample of safety
14 resource centers and does not reflect the activities of those not based in children's
15 hospitals
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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

1
2
3 communities⁶, these institutions service a demographically diverse group including
4
5 children at high risk for potential injury.⁷ As a result, being able to provide prevention
6
7 education, services, and products within these children's hospitals can be a key
8
9 component to preventing injuries to children in the future. Gittelman and colleagues have
10
11 previously described the use of a Safety Resource Center (SRC) located in the ED of a
12
13 large, tertiary care children's hospital in an urban setting.^{3 8} They found that 97% of
14
15 customers contacted in follow-up were still using items they purchased at the SRC, and
16
17 over one quarter of customers made a change in home safety behaviors after their visit.
18
19 75% of customers who made a purchase did not have previous knowledge of the SRC
20
21 prior to their visit.⁸
22
23
24
25
26
27
28

29 There are currently 38 known SRCs affiliated with 30 children's hospitals. Each SRC is
30
31 located in its unique setting (eg. ED, gift shop, primary care clinic, etc). The U.S.
32
33 Children's Hospital Association is a voluntary institutional membership organization
34
35 representing 217 children's hospitals in the U.S. Conservatively, this membership
36
37 represents approximately 87% of all eligible children's hospitals and pediatric units that
38
39 exist in The Children's Hospital Association has been supportive of these centers and has
40
41 historically offered funding to facilitate development of SRCs as well as peer learning
42
43 and networking among centers. The Children's Hospital Association continues to
44
45 maintain a comprehensive and current list of these centers and their directors/contacts.
46
47
48
49
50

51
52 SRCs help provide families with discounted product and enhanced education about safety
53
54 that many clinicians may not have the time or resources to provide. Despite their recent
55
56
57
58
59
60

1
2
3 growth and evidence of success, no study has assessed the state and function of SRCs
4 located in children's hospitals in the United States. The objective of this study was to
5 describe the location, staffing, clientele, safety product disbursement patterns, education
6 provided and sustainability of Safety Resource Centers (SRCs) in United States
7 children's hospitals.
8
9
10
11
12
13

14 15 16 17 **METHODS**

18 19 **Study Design**

20 This was a confidential, cross-sectional survey of children's hospital based safety
21 resource centers. The survey was developed by the authors, and edited after receiving
22 feedback from an individual who had experience with SRCs but was not eligible to
23 complete the survey. Consent was implied by completion of the survey. The Children's
24 Hospital of Philadelphia institutional review board reviewed the protocol and deemed this
25 study to be exempt from human subjects research.
26
27
28
29
30
31
32
33
34
35
36
37
38

39 **Study Setting & Population**

40 Directors of children's hospital based SRCs, or their appropriate managers, were
41 identified by the Children's Hospital Association. Those identified as most
42 knowledgeable about the SRC at each hospital were provided advanced notice of the
43 survey via e-mail notification. The SRC representative was then invited to participate via
44 an e-mail request from the Children's Hospital Association. If the children's hospital was
45 known to have multiple SRCs, the primary contact at that hospital either completed
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 multiple surveys (one for each SRC), or distributed the survey to other colleagues more
4
5 knowledgeable about their specific SRC.
6
7
8
9

10 **Study Protocol**

11
12 The electronic survey was designed, and data collected and managed using Research
13 Electronic Data Capture (REDCap) software,⁹ a secure, web-based application designed
14
15 to support data collection for research studies. The Children's Hospital Association
16
17 emailed a cover letter that introduced the study and included a generic web address link
18
19 to the REDCap questionnaire to all SRC contacts between September and October of
20
21 2012. (The survey is available upon request).
22
23
24
25
26

27
28 After the initial email, three e-mail reminders were sent to non-respondents over a five
29
30 week period. No compensation was offered for participation.
31
32
33
34

35 **Measurements**

36
37 The survey included multiple choice questions with space for additional answers. Survey
38
39 categories included: funding sources, customer base, items sold, items given away,
40
41 education provided (including 'formal' (ie, targeted, in-person instruction) and 'informal'
42
43 (ie, written materials and other passive education)), follow up performed and perceived
44
45 barriers to managing the SRC.
46
47
48
49
50

51 **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 only 16 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

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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

1
2
3 funding issues. This is supported by the fact that only 19% of SRCs identified as self-
4 sustainable, an issue which has been previously discussed in the literature.³ This study
5
6 did not explicitly ask about the business model for the SRCs or ask respondents to
7
8 indicate if the center was established with the intention of being self-sustaining.
9
10

11
12 However, it does appear that many SRC directors feel that the only way to become truly
13
14 self-sustainable would be to increase equipment prices, which is directly opposite the
15
16 goal of making IP equipment more accessible to lower income, high risk families.
17
18

19
20
21 Novel ways will need to be investigated to make SRCs sustainable, if not self-
22
23 sustainable. One possibility is to leverage the fact that a large percentage of some SRC's
24
25 customers are hospital employees. Previous studies in the business literature have shown
26
27 that employee wellness programs may have a return on their investment of six to one.¹² A
28
29 novel funding and advertising idea for SRCs is to market themselves as part of employee
30
31 wellness programs, as the benefit of injury prevention to the children of employees may
32
33 provide significant benefits as do other aspects of the program. Income derived from
34
35 purchases from employees may help offset costs to provide injury prevention equipment
36
37 to other more disadvantaged groups. Studies have shown that injuries tend to
38
39 disproportionately affect socioeconomically disadvantaged and non-white children,
40
41 possibly related to lack of culturally appropriate education, language barriers, and
42
43 socioeconomic status socioeconomic status.^{6 13} The urban communities surrounding
44
45 many children's hospitals are those in which many of these families live. The presence
46
47 of SRCs in these communities, supported by their local children's hospital, is one
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 important way the significant morbidity and mortality due to unintentional injury can be
4
5 addressed.
6
7
8
9

10 This study did have some limitations. The survey was limited to children's hospital SRCs
11 identified by the Children's Hospital Association, and although we believe that the
12 majority of SRCs are children's hospital based, these data may not be generalizable to
13 SRCs that are not affiliated with children's hospitals. The survey was completed by the
14 director of each SRC, and therefore based on their recollection and understanding of the
15 function of the site, possibly introducing recall bias. Although the survey did include a
16 few open-ended questions, it was not predominately qualitative, and fine details may not
17 have been identified. Finally, the survey was confidential but not anonymous, which may
18 have biased responses.
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33

34 CONCLUSIONS

35
36
37
38 Children's hospital based SRCs vary widely in the way they function, their clientele, and
39 in the services and products provided. They have similar challenges, most of which are
40 related to funding and sustainability. The issues of sustainability may be addressed by
41 increased financial support for SRCs by the children's hospitals which host them,
42 especially due to the significant benefit to the children in the communities the hospitals
43 serve, as well as the children of hospital employees. This study is suggestive of one
44 possible standardized best practice model of an SRC that utilizes volunteer staff, has
45 consistent hospital and/or grant funding, and provides formal hands-on education in
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 addition to discounted IP equipment. Future collaborative research will help to confirm
4
5 best practices for location, staffing, and funding at sites, as well as ways to improve the
6
7 income and sustainability of SRCs.
8
9

10
11
12 **Acknowledgements:** The authors would like to thank the safety resource center directors
13
14 and administrators who participated in the study.
15
16

17
18
19 **Contributors** SK, MRZ, KSH, KBA and MAG designed the research; SK, MRZ, KSH,
20
21 KBA, and MAG conducted the research; SK analysed the data; SK drafted the
22
23 manuscript; SK, MRZ, KSH, KBA and MAG reviewed and approved the final
24
25 manuscript; SK had primary responsibility for final content
26
27
28

29
30
31 **Funding** Funding by the Nicholas Crognale Chair for Emergency Medicine at the
32
33 Children's Hospital of Philadelphia
34
35

36
37
38 **Competing interests** None
39
40

41
42
43 **Ethics approval** Exempt from review by Children's Hospital of Philadelphia institutional
44
45 review board
46
47

48
49
50 **Data sharing statement** No additional data are available.
51
52

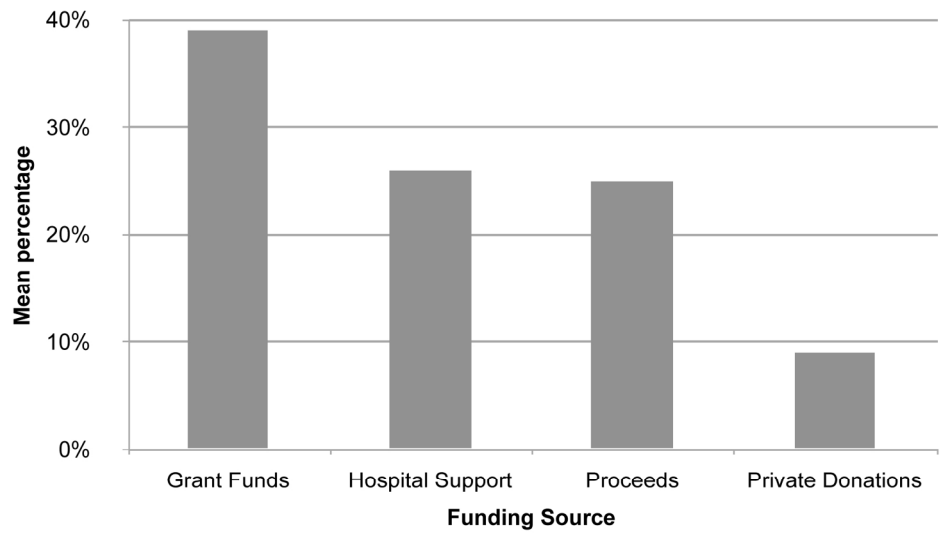
53
54
55 **Competing interests:** None
56
57
58
59
60

REFERENCES

1. Centers for Disease Control and Prevention (CDC). Web-based Injury Statistics Query and Reporting System (WISQARS). Available at:
<http://www.cdc.gov/injury/wisqars>. Accessed July 1, 2012.
2. Janssens L, Gorter JW, Ketelaar M, Kramer WLM, Holtslag HR. Long-term health condition in major pediatric trauma: a pilot study. *Journal of Pediatric Surgery* 2009;44(8):1591-600.
3. Gittelman MA, Pomerantz WJ. Starting a pediatric emergency department Safety Resource Center. *Pediatric annals* 2009;38(3):149-55.
4. Posner JC, Hawkins LA, Garcia-Espana F, Durbin DR. A randomized, clinical trial of a home safety intervention based in an emergency department setting. *Pediatrics* 2004;113(6 I):1603-08.
5. Gittelman MA, Pomerantz WJ, Laurence S. An emergency department intervention to increase booster seat use for lower socioeconomic families. *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 2006;13(4):396-400.
6. Brown RL. Epidemiology of injury and the impact of health disparities. *Curr Opin Pediatr* 2010;22(3):321-5.
7. NACHRI. All Children Need Children's Hospitals. 3rd ed.
<http://www.childrenshospitals.net>, 2007.

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
8. Gittelman MA, Pomerantz WJ, Frey LK. Use of a safety resource center in a pediatric emergency department. *Pediatric emergency care* 2009;25(7):429-33.
 9. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of biomedical informatics* 2009;42(2):377-81.
 10. Gielen AC, McKenzie LB, McDonald EM, Shields WC, Wang MC, Cheng YJ, et al. Using a computer kiosk to promote child safety: results of a randomized, controlled trial in an urban pediatric emergency department. *Pediatrics* 2007;120(2):330-9.
 11. Edmonds S, Arbogast KB, Duchossois GP, Zonfrillo MR. Usage Characteristics of a children's hospital safety center. *Pediatric Academic Societies' Annual Meeting*. Washington, D.C. , 2013.
 12. Berry LL, Mirabito AM, Baun WB. What's the hard return on employee wellness programs? *Harv Bus Rev* 2010;88(12):104-12, 42.
 13. McDonald EM, Solomon B, Shields W, Serwint JR, Jacobsen H, Weaver NL, et al. Evaluation of kiosk-based tailoring to promote household safety behaviors in an urban pediatric primary care practice. *Patient education and counseling* 2005;58(2):168-81.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Distribution of funding sources for Safety Resource Centers
159x91mm (300 x 300 DPI)

review only



National survey of children's hospital based safety resource centers

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004398.R1
Article Type:	Research
Date Submitted by the Author:	07-Feb-2014
Complete List of Authors:	Kendi, Sadiqa; The Alpert Medical School of Brown University, Department of Emergency Medicine and Pediatrics Zonfrillo, Mark; The Childrens Hospital of Philadelphia, Center for Injury Research and Prevention, and Division of Emergency Medicine; Perelman School of Medicine, Department of Pediatrics Seaver Hill, Karen; Children's Hospital Association, Child Advocacy Department Arbogast, Kristy; The Childrens Hospital of Philadelphia, Center for Injury Research and Prevention, and Division of Emergency Medicine; Perelman School of Medicine, Department of Pediatrics Gittelman, Michael; Division of Emergency Medicine Comprehensive Children's Injury Center, Cincinnati Children's Hospital
Primary Subject Heading:	Paediatrics
Secondary Subject Heading:	Public health
Keywords:	education, advocacy, safety center

SCHOLARONE™
Manuscripts

only

1
2
3 National survey of children's hospital based safety resource centers
4

5 Sadiqa Kendi, MD¹, Mark R. Zonfrillo, MD, MSCE,^{2,3} Karen Seaver Hill⁴, Kristy B.
6 Arbogast, PhD^{2,3} Michael A. Gittelman, MD^{5,6}
7
8

9 ¹ Department of Emergency Medicine and Pediatrics, The Alpert Medical School of
10 Brown University, Providence, Rhode Island, USA
11

12 ² Division of Emergency Medicine and Center for Injury Research and Prevention, The
13 Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, USA
14

15 ³ Department of Pediatrics, Perelman School of Medicine, University of Pennsylvania,
16 Philadelphia, Pennsylvania, USA
17

18 ⁴ Children's Hospital Association, Alexandria, Virginia, USA
19

20 ⁵ Department of Clinical Pediatrics, University of Cincinnati School of Medicine,
21 Cincinnati, Ohio, USA
22

23 ⁶ Division of Emergency Medicine Comprehensive Children's Injury Center, Cincinnati
24 Children's Hospital, Cincinnati, Ohio, USA
25

26
27 **Keywords:** education, dissemination, advocacy, hospital care, safety center
28

29
30
31 **Address correspondence to:**

32 Mark R. Zonfrillo, MD, MSCE
33 Children's Hospital of Philadelphia
34 Division of Emergency Medicine
35 34th and Civic Center Boulevard
36 Philadelphia, PA 19104
37 Telephone: 267-426-0294
38 Fax: 215-590-5425
39 E-mail: zonfrillo@email.chop.edu
40
41
42

43 **Abstract word count:** 250
44

45 **Word Count:** 2194
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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 listserv, 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.

1
2
3
4
5
6 Strengths and limitations of this study
7

- 8 ▪ This study is the first to describe the function and variability of children's hospital
9 based safety resource centers in the United States (US)
- 10 ▪ Safety resource centers are located in many US children's hospitals, and vary in terms
11 of center settings, products sold, data kept, and ability to be financially sustained
- 12 ▪ While the response rate to the survey was high, it is an overall small sample of safety
13 resource centers and does not reflect the activities of those not based in children's
14 hospitals
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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.

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 communities⁸, these institutions service a demographically diverse group including

1
2
3 children at high risk for potential injury.⁹ Gittelman and colleagues have previously
4 described the use of a Safety Resource Center (SRC) located in the ED of a large, tertiary
5 care children's hospital in an urban setting.^{5 10} They found that 97% of customers
6 contacted in follow-up were still using items they purchased at the SRC, and over one
7 quarter of customers made a change in home safety behaviors after their visit. 75% of
8 customers who made a purchase did not have previous knowledge of the SRC prior to
9 their visit.¹⁰
10
11
12
13
14
15
16
17
18
19
20
21

22 There are currently 38 known SRCs affiliated with 30 children's hospitals. Each SRC is
23 located in its unique setting (eg. ED, gift shop, primary care clinic, etc). The U.S.
24 Children's Hospital Association is a voluntary institutional membership organization
25 representing 217 children's hospitals in the U.S. Conservatively, this membership
26 represents approximately 87% of all eligible children's hospitals and pediatric units that
27 exist in The Children's Hospital Association, who maintains a comprehensive and current
28 list of these centers and their directors/contacts.
29
30
31
32
33
34
35
36
37
38
39
40

41 SRCs help provide families with discounted product and enhanced education about safety
42 that many clinicians may not have the time or resources to provide. Despite their recent
43 growth and evidence of success, no study has assessed the state and function of SRCs
44 located in children's hospitals in the United States. The objective of this study was to
45 describe the location, staffing, clientele, safety product disbursement patterns, education
46 provided and sustainability of Safety Resource Centers (SRCs) in United States
47 children's hospitals.
48
49
50
51
52
53
54
55
56
57
58
59
60

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

1
2
3 to support data collection for research studies. The Children's Hospital Association
4
5
6 emailed a cover letter that introduced the study and included a generic web address link
7
8 to the REDCap questionnaire to all SRC contacts between September and October of
9
10 2012. (The survey is available upon request).
11

12
13
14 After the initial email, three e-mail reminders were sent to non-respondents over a five
15
16 week period. No compensation was offered for participation.
17
18

19 20 21 **Measurements**

22
23 The survey included multiple choice questions with space for additional answers. Survey
24
25 categories included: funding sources, customer base, items sold, items given free of
26
27 charge, education provided (including 'formal' (ie, targeted, in-person instruction) and
28
29 'informal' (ie, written materials and other passive education)), follow up performed and
30
31 perceived barriers to managing the SRC.
32
33
34
35
36

37 38 **Data Analysis**

39
40 Survey results were analyzed using Stata (Version 10.0, StataCorp, College Station, TX).
41
42 Descriptive statistics were used to summarize variables, using means to summarize
43
44 continuous variables.
45
46
47

48 49 **RESULTS**

50
51 Thirty-two of thirty eight sites (84.2%) affiliated with thirty children's hospitals
52
53 completed surveys. All sites were established within the last 8 years; the majority
54
55
56
57
58
59
60

(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

1
2
3 listserv to share information electronically with other SRCs, a national data bank of all
4
5 SRCs, as well as collaborative research.
6
7
8
9

10 **DISCUSSION**

11
12 This is the first study to describe the state and function of United States children's
13 hospital-based SRCs. These results show that SRCs vary widely in the way they function,
14 their clientele, and in the services and products provided. SRCs are traditionally defined
15 as centers which provide discounted or free injury prevention equipment in addition to
16 injury prevention education to families.¹⁰ However, this study found that only half of
17 SRCs offer formal, hands-on injury prevention education. Prior work has shown that the
18 combination of equipment with formal education is the best strategy for increasing proper
19 use of injury prevention equipment.^{6,7} The current practices of SRCs assessed in our
20 study included the distribution of written education materials with many purchases.
21
22 Future studies should determine identify and assess best practices for SRC activities.
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38

39 Prior descriptions of SRCs have focused on single institutions, without a comparison
40 across various locations or a description of the customers served.^{10,12} This study has
41 identified that the customer demographics across SRCs vary widely, and has confirmed
42 findings identified in a previous analysis that employees comprise a significant
43 percentage of customers in some sites.¹³
44
45
46
47
48
49
50
51
52

53 The barriers to managing SRCs identified consistently by sites included staffing issues,
54 lack of storage space, and lack of time, all of which are influenced by funding. This is
55
56
57
58
59
60

1 supported by the fact that only 18.8% of SRCs identified as self-sustainable, an issue
2
3 which has been previously discussed in the literature.⁵ This study did not explicitly ask
4
5 about the business model for the SRCs or ask respondents to indicate if the center was
6
7 established with the intention of being self-sustaining. However, many SRC directors felt
8
9 that the best way to become truly self-sustainable would be to increase equipment prices,
10
11 which contrasts with the goal of making injury prevention equipment more accessible to
12
13 lower income, high risk families. One possible strategy to increase the sustainability of
14
15 SRCs is to leverage the fact that many customers are hospital employees. Previous
16
17 studies in the business literature have shown that employee wellness programs are up to
18
19 six times as profitable as the initial investment in such programs.¹⁴ A novel funding and
20
21 advertising idea for SRCs is to market themselves as part of employee wellness
22
23 programs, as the benefit of injury prevention to the children of employees may provide
24
25 significant benefits as do other aspects of the program. Income derived from purchases
26
27 from employees may help offset costs to provide injury prevention equipment to other
28
29 more disadvantaged groups. Studies have shown that injuries tend to disproportionately
30
31 affect socioeconomically disadvantaged and non-white children, possibly related to lack
32
33 of culturally appropriate education, language barriers, and socioeconomic status
34
35 socioeconomic status.^{8 15} The urban communities surrounding many children's hospitals
36
37 are those in which many of these families live. The presence of SRCs in these
38
39 communities, supported by their local children's hospital, is one important way to reduce
40
41 the significant morbidity and mortality from unintentional injury.
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 This study did have some limitations. The survey was limited to children's hospital SRCs
4 identified by the Children's Hospital Association, and therefore may not be generalizable
5 to SRCs that are not affiliated with children's hospitals. The survey was completed by the
6 director of each SRC, and therefore based on their recollection and understanding of the
7 function of the site, possibly introducing recall bias. Although the survey did include a
8 few open-ended questions, it was not predominately qualitative, and fine details may not
9 have been identified. Additionally, the relative benefits of the various SRC interventions
10 and the customers' use of the safety products was not measured. Finally, the survey was
11 confidential but not anonymous, which may have biased responses.
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

27 CONCLUSIONS

28
29
30
31 Children's hospital based SRCs vary widely in the way they function, their clientele, and
32 in the services and products provided. They have similar challenges, most of which are
33 related to funding and sustainability. The issues of sustainability may be addressed by
34 increased financial support for SRCs by the children's hospitals which host them,
35 especially due to the significant benefit to the children in the communities the hospitals
36 serve, as well as the children of hospital employees. Future collaborative research will
37 help to confirm best practices for location, staffing, and funding at sites, as well as ways
38 to improve the income and sustainability of SRCs.
39
40
41
42
43
44
45
46
47
48
49
50
51
52

53 **Acknowledgements:** The authors would like to thank the safety resource center directors
54 and administrators who participated in the study.
55
56
57
58
59
60

1
2
3
4
5
6 **Funding** Funding by the Nicholas Crognale Chair for Emergency Medicine at the
7
8 Children's Hospital of Philadelphia
9

10
11
12 **Contributors** SK, MRZ, KSH, KBA and MAG designed the research; SK, MRZ, KSH,
13
14 KBA, and MAG conducted the research; SK analysed the data; SK drafted the
15
16 manuscript; SK, MRZ, KSH, KBA and MAG reviewed and approved the final
17
18 manuscript; SK had primary responsibility for final content
19
20
21

22
23
24 **Competing interests** None
25
26
27

28
29 **Ethics approval** Exempt from review by Children's Hospital of Philadelphia institutional
30
31 review board
32
33

34
35
36 **Data sharing statement** No additional data are available.
37
38

39
40
41 **Competing interests:** None
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

REFERENCES

1. Centers for Disease Control and Prevention (CDC). Web-based Injury Statistics Query and Reporting System (WISQARS). Available at:
<http://www.cdc.gov/injury/wisqars>. Accessed July 1, 2012.
2. Janssens L, Gorter JW, Ketelaar M, et al. Long-term health condition in major pediatric trauma: a pilot study. *Journal of Pediatric Surgery* 2009;44(8):1591-600.
3. Centers for Disease Control and Prevention. Prevention Status Report. Available at
<http://www.cdc.gov/stltpublichealth/psr>. Accessed January 31, 2014.
4. European Child Safety Alliance. Child Safety Report Cards. Available at:
<http://www.childsafetyeurope.org/reportcards/index.html>. Accessed January 31, 2013.
5. Gittelman MA, Pomerantz WJ. Starting a pediatric emergency department Safety Resource Center. *Pediatric annals* 2009;38(3):149-55.
6. Posner JC, Hawkins LA, Garcia-Espana F, et al. A randomized, clinical trial of a home safety intervention based in an emergency department setting. *Pediatrics* 2004;113(6 I):1603-08.
7. Gittelman MA, Pomerantz WJ, Laurence S. An emergency department intervention to increase booster seat use for lower socioeconomic families. *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 2006;13(4):396-400.
8. Brown RL. Epidemiology of injury and the impact of health disparities. *Curr Opin Pediatr* 2010;22(3):321-5.

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
9. NACHRI. All Children Need Children's Hospitals. 3rd ed.
<http://www.childrenshospitals.net>, 2007.
 10. Gittelman MA, Pomerantz WJ, Frey LK. Use of a safety resource center in a pediatric emergency department. *Pediatric emergency care* 2009;25(7):429-33.
 11. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of biomedical informatics* 2009;42(2):377-81.
 12. Gielen AC, McKenzie LB, McDonald EM, et al. Using a computer kiosk to promote child safety: results of a randomized, controlled trial in an urban pediatric emergency department. *Pediatrics* 2007;120(2):330-9.
 13. Edmonds S, Arbogast KB, Duchossois GP, et al. Usage Characteristics of a children's hospital safety center. *Pediatric Academic Societies' Annual Meeting*. Washington, D.C. , 2013.
 14. Berry LL, Mirabito AM, Baun WB. What's the hard return on employee wellness programs? *Harv Bus Rev* 2010;88(12):104-12, 42.
 15. McDonald EM, Solomon B, Shields W, et al. Evaluation of kiosk-based tailoring to promote household safety behaviors in an urban pediatric primary care practice. *Patient education and counseling* 2005;58(2):168-81.

1
2
3
4
5
6
7
8 National survey of children's hospital based safety resource centers
9

10 Sadiqa Kendi, MD¹, Mark R. Zonfrillo, MD, MSCE,^{2,3} Karen Seaver Hill⁴, Kristy B.
11 Arbogast, PhD^{2,3} Michael A. Gittelman, MD^{5,6}
12

13 ¹ Department of Emergency Medicine and Pediatrics, The Alpert Medical School of
14 Brown University, Providence, Rhode Island, USA
15

16 ² Division of Emergency Medicine and Center for Injury Research and Prevention, The
17 Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, USA
18

19 ³ Department of Pediatrics, Perelman School of Medicine, University of Pennsylvania,
20 Philadelphia, Pennsylvania, USA
21

22 ⁴ Children's Hospital Association, Alexandria, Virginia, USA
23

24 ⁵ Department of Clinical Pediatrics, University of Cincinnati School of Medicine,
25 Cincinnati, Ohio, USA
26

27 ⁶ Division of Emergency Medicine Comprehensive Children's Injury Center, Cincinnati
28 Children's Hospital, Cincinnati, Ohio, USA
29

30 **Keywords:** education, dissemination, advocacy, hospital care, safety center
31

32 **Address correspondence to:**

33 Mark R. Zonfrillo, MD, MSCE
34 Children's Hospital of Philadelphia
35 Division of Emergency Medicine
36 34th and Civic Center Boulevard
37 Philadelphia, PA 19104
38 Telephone: 267-426-0294
39 Fax: 215-590-5425
40 E-mail: zonfrillo@email.chop.edu

41 | **Abstract word count:** 250
42

43 | **Word Count:** 2194
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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.

1
2
3
4
5
6
7
8
9
10 Strengths and limitations of this study
11

- 12 ▪ This study is the first to describe the function and variability of children's hospital
13 based safety resource centers in the United States (US)
- 14 ▪ Safety resource centers are located in many US children's hospitals, and vary in terms
15 of center settings, products sold, data kept, and ability to be financially sustained
16
- 17 ▪ While the response rate to the survey was high, it is an overall small sample of safety
18 resource centers and does not reflect the activities of those not based in children's
19 hospitals
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

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

1
2
3
4
5
6
7
8 socioeconomically disadvantaged and non-white children who often live in these
9 communities⁸, these institutions service a demographically diverse group including
10 children at high risk for potential injury.⁹ ~~As a result, being able to provide prevention~~
11 ~~education, services, and products within these children's hospitals can be a key~~
12 ~~component to preventing injuries to children in the future.~~ Gittelman and colleagues have
13 previously described the use of a Safety Resource Center (SRC) located in the ED of a
14 large, tertiary care children's hospital in an urban setting.^{5 10} They found that 97% of
15 customers contacted in follow-up were still using items they purchased at the SRC, and
16 over one quarter of customers made a change in home safety behaviors after their visit.
17 75% of customers who made a purchase did not have previous knowledge of the SRC
18 prior to their visit.¹⁰
19
20
21
22
23
24
25
26
27
28
29

30
31 There are currently 38 known SRCs affiliated with 30 children's hospitals. Each SRC is
32 located in its unique setting (eg. ED, gift shop, primary care clinic, etc). The U.S.
33 Children's Hospital Association is a voluntary institutional membership organization
34 representing 217 children's hospitals in the U.S. Conservatively, this membership
35 represents approximately 87% of all eligible children's hospitals and pediatric units that
36 exist in The Children's Hospital Association, ~~who has been supportive of these centers~~
37 ~~and has historically offered funding to facilitate development of SRCs as well as peer~~
38 ~~learning and networking among centers. The Children's Hospital Association continues~~
39 ~~to maintain/maintains~~ a comprehensive and current list of these centers and their
40 directors/contacts.
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8 SRCs help provide families with discounted product and enhanced education about safety
9
10 that many clinicians may not have the time or resources to provide. Despite their recent
11
12 growth and evidence of success, no study has assessed the state and function of SRCs
13
14 located in children's hospitals in the United States. The objective of this study was to
15
16 describe the location, staffing, clientele, safety product disbursement patterns, education
17
18 provided and sustainability of Safety Resource Centers (SRCs) in United States
19
20 children's hospitals.
21

22 23 24 **METHODS**

25 26 **Study Design**

27 This was a confidential, cross-sectional survey of children's hospital based safety
28
29 resource centers. The survey was developed by the authors, and edited after receiving
30
31 feedback from an individual who had experience with SRCs but was not eligible to
32
33 complete the survey. Consent was implied by completion of the survey. The Children's
34
35 Hospital of Philadelphia institutional review board reviewed the protocol and deemed this
36
37 study to be exempt from human subjects research.
38

39 40 41 **Study Setting & Population**

42 Directors of children's hospital based SRCs, or their appropriate managers, were
43
44 identified by the Children's Hospital Association. Those identified as most
45
46 knowledgeable about the SRC at each hospital were provided advanced notice of the
47
48 survey via e-mail notification. The SRC representative was then invited to participate via
49
50 an e-mail request from the Children's Hospital Association. If the children's hospital was
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8 known to have multiple SRCs, the primary contact at that hospital either completed
9 multiple surveys (one for each SRC), or distributed the survey to other colleagues more
10 knowledgeable about their specific SRC.
11
12
13

14 15 16 **Study Protocol**

17
18 The electronic survey was designed, and data collected and managed using Research
19 Electronic Data Capture (REDCap) software,¹¹ a secure, web-based application designed
20 to support data collection for research studies. The Children's Hospital Association
21 emailed a cover letter that introduced the study and included a generic web address link
22 to the REDCap questionnaire to all SRC contacts between September and October of
23 2012. (The survey is available upon request).
24
25
26
27
28

29
30 After the initial email, three e-mail reminders were sent to non-respondents over a five
31 week period. No compensation was offered for participation.
32
33
34
35

36 **Measurements**

37
38 The survey included multiple choice questions with space for additional answers. Survey
39 categories included: funding sources, customer base, items sold, items given ~~away~~free of
40 charge, education provided (including 'formal' (ie, targeted, in-person instruction) and
41 'informal' (ie, written materials and other passive education)), follow up performed and
42 perceived barriers to managing the SRC.
43
44
45
46
47
48

49 **Data Analysis**

50
51
52
53
54
55
56
57
58
59
60

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	4	4	30	22-70
Community members	22.5	34	32	10-60
Employees	20	15	18	2-28

Formatted Table

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)

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

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.

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

Product	Available for sale		Available for free distribution	
	N	%	N	%
Stove shield	<u>22</u>	<u>68.8</u>	<u>5</u>	<u>15.6</u>
Bicycle helmet	<u>19</u>	<u>59.4</u>	<u>13</u>	<u>40.6</u>
Cabinet/drawer lock	<u>19</u>	<u>59.4</u>	<u>9</u>	<u>28.1</u>
Window cord wind-up	<u>19</u>	<u>59.4</u>	<u>7</u>	<u>21.9</u>
Carbon monoxide detector	<u>18</u>	<u>56.4</u>	<u>5</u>	<u>15.6</u>
Baby gate	<u>17</u>	<u>53.1</u>	<u>7</u>	<u>21.9</u>
Combination car seat	<u>17</u>	<u>53.1</u>	<u>12</u>	<u>37.5</u>
Convertible car seat	<u>17</u>	<u>53.1</u>	<u>13</u>	<u>40.6</u>
Home child proofing kit	<u>17</u>	<u>53.1</u>	<u>13</u>	<u>40.6</u>
Backless booster seat	<u>16</u>	<u>50.0</u>	<u>12</u>	<u>37.5</u>
High back booster seat	<u>16</u>	<u>50.0</u>	<u>13</u>	<u>40.6</u>
Smoke alarm	<u>16</u>	<u>50.0</u>	<u>9</u>	<u>28.1</u>
Infant car seat	<u>14</u>	<u>43.1</u>	<u>11</u>	<u>34.4</u>
Gun lock	<u>4</u>	<u>12.5</u>	<u>13</u>	<u>40.6</u>

1
2
3
4
5
6
7
8 SRC staffing also varies, with 0-6 paid staff and 0-9+ unpaid volunteers. Nineteen sites
9
10 (59.4%) require Child Passenger Safety (CPS) certification, and 20 (62.5%) require other
11 informal training for their paid staff. Six sites (18.8%) require other types of formal
12 training for staff, and 2 sites (6.3%) require no training. Fewer sites require training for
13 their volunteer staff: 3 (9.4%) CPS certification and formal curricular training, 9 (28.1%)
14 informal training, and 3 (9.4%) no training.
15
16
17
18
19

20
21 Sites are primarily funded by grants and hospital support. (Figure 1) Twelve sites
22 (37.5%) report an annual gross income between \$5,000 and \$10,000 dollars, with the
23 remainder reporting an income range of \$10,000 to \$50,000. Only 18.8% of SRCs
24 identified as being self-sustainable. Respondents reported barriers and needs in
25 management of the SRC, with 16 sites (50.0%) identifying staffing issues, 15 (46.9%)
26 lack of funds, 15 (46.9%) storage space, and 12 (37.5%) lack of time as significant
27 barriers. All respondents were interested in future collaboration through utilizing a
28 listserv to share information electronically with other SRCs, a national data bank of all
29 SRCs, as well as collaborative research.
30
31
32
33
34
35
36
37
38
39

40 41 DISCUSSION

42 This is the first study to describe the state and function of United States children's
43 hospital-based SRCs. These results show that SRCs vary widely in the way they function,
44 their clientele, and in the services and products provided. They SRCs are traditionally
45 defined as centers which provide discounted or free injury prevention equipment in
46 addition to injury prevention education to families.¹⁰ However, in this study we found
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8 that only half of SRCs offer formal, hands-on injury prevention education. ~~Studies Prior~~
9 ~~work has~~ have shown that the combination of equipment with formal education is the best
10 strategy for increasing proper use of injury prevention equipment.^{6,7} ~~The current practices~~
11 ~~of SRCs assessed in our study included the distribution of~~ Our findings did confirm that
12 ~~informal education in the form of pamphlets and~~ written education materials ~~is provided~~
13 with many purchases. Future studies should determine ~~which identify and assess best~~
14 ~~practices for SRC activities~~ approach should be advocated as SRC best practice.
15
16
17
18
19
20
21
22
23

24 Prior descriptions of SRCs have focused on single institutions, without a comparison
25 across various locations or a description of the customers served.^{10,12} This study has
26 identified that the customer demographics across SRCs vary widely, and has confirmed
27 findings identified in a previous analysis that employees ~~make up~~ comprise a significant
28 percentage of customers in some sites.¹³
29
30
31
32
33
34

35 The barriers to managing SRCs identified consistently by sites included staffing issues,
36 lack of storage space, and lack of time, all of which are ~~at least partially~~ influenced by
37 funding ~~issues~~. This is supported by the fact that only 18.89% of SRCs identified as self-
38 sustainable, an issue which has been previously discussed in the literature.⁵ This study
39 did not explicitly ask about the business model for the SRCs or ask respondents to
40 indicate if the center was established with the intention of being self-sustaining.
41
42
43
44
45
46

47 However, ~~it does appear that~~ many SRC directors ~~feel felt~~ that the only best way to
48 become truly self-sustainable would be to increase equipment prices, which ~~is directly~~
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8 ~~opposite~~ contrasts with the goal of making ~~IP~~ injury prevention equipment more
9
10 accessible to lower income, high risk families.

11
12
13
14 ~~Novel ways will need to be investigated to make SRCs sustainable, if not self~~
15 ~~sustainable.~~ One ~~possibility~~ possible strategy to increase the sustainability of SRCs is to
16
17 leverage the fact that ~~many a large percentage of some SRC's~~ customers are hospital
18
19 employees. Previous studies in the business literature have shown that employee
20
21 wellness programs are up to six times as profitable as the initial investment in such
22
23 programs ~~may have a return on their investment of six to one.~~¹⁴ A novel funding and
24
25 advertising idea for SRCs is to market themselves as part of employee wellness
26
27 programs, as the benefit of injury prevention to the children of employees may provide
28
29 significant benefits as do other aspects of the program. Income derived from purchases
30
31 from employees may help offset costs to provide injury prevention equipment to other
32
33 more disadvantaged groups. Studies have shown that injuries tend to disproportionately
34
35 affect socioeconomically disadvantaged and non-white children, possibly related to lack
36
37 of culturally appropriate education, language barriers, and socioeconomic status
38
39 socioeconomic status.^{8 15} The urban communities surrounding many children's hospitals
40
41 are those in which many of these families live. The presence of SRCs in these
42
43 communities, supported by their local children's hospital, is one important way ~~the to~~
44
45 reduce the significant morbidity and mortality ~~due to from~~ unintentional injury ~~can be~~
46
47 addressed.
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8 This study did have some limitations. The survey was limited to children's hospital SRCs
9 identified by the Children's Hospital Association, and ~~although we believe that the~~
10 ~~majority of SRCs are children's hospital based, these data therefore~~ may not be
11
12 generalizable to SRCs that are not affiliated with children's hospitals. The survey was
13
14 completed by the director of each SRC, and therefore based on their recollection and
15
16 understanding of the function of the site, possibly introducing recall bias. Although the
17
18 survey did include a few open-ended questions, it was not predominately qualitative, and
19
20 fine details may not have been identified. Additionally, the relative benefits of the various
21
22 SRC interventions and the customers' use of the safety products was not measured.
23
24 Finally, the survey was confidential but not anonymous, which may have biased
25
26 responses.
27
28
29

30 31 CONCLUSIONS

32
33
34 Children's hospital based SRCs vary widely in the way they function, their clientele, and
35
36 in the services and products provided. They have similar challenges, most of which are
37
38 related to funding and sustainability. The issues of sustainability may be addressed by
39
40 increased financial support for SRCs by the children's hospitals which host them,
41
42 especially due to the significant benefit to the children in the communities the hospitals
43
44 serve, as well as the children of hospital employees. ~~This study is suggestive of one~~
45
46 ~~possible standardized best practice model of an SRC that utilizes volunteer staff, has~~
47
48 ~~consistent hospital and/or grant funding, and provides formal hands-on education in~~
49
50 ~~addition to discounted IP equipment.~~ Future collaborative research will help to confirm
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8 best practices for location, staffing, and funding at sites, as well as ways to improve the
9 income and sustainability of SRCs.
10
11

12
13
14 **Acknowledgements:** The authors would like to thank the safety resource center directors
15 and administrators who participated in the study.
16
17

18
19
20 **Contributors** SK, MRZ, KSH, KBA and MAG designed the research; SK, MRZ, KSH,
21 KBA, and MAG conducted the research; SK analysed the data; SK drafted the
22 manuscript; SK, MRZ, KSH, KBA and MAG reviewed and approved the final
23 manuscript; SK had primary responsibility for final content
24
25
26
27

28
29
30 **Funding** Funding by the Nicholas Crognale Chair for Emergency Medicine at the
31 Children's Hospital of Philadelphia
32
33

34
35 **Competing interests** None
36
37

38
39 **Ethics approval** Exempt from review by Children's Hospital of Philadelphia institutional
40 review board
41
42

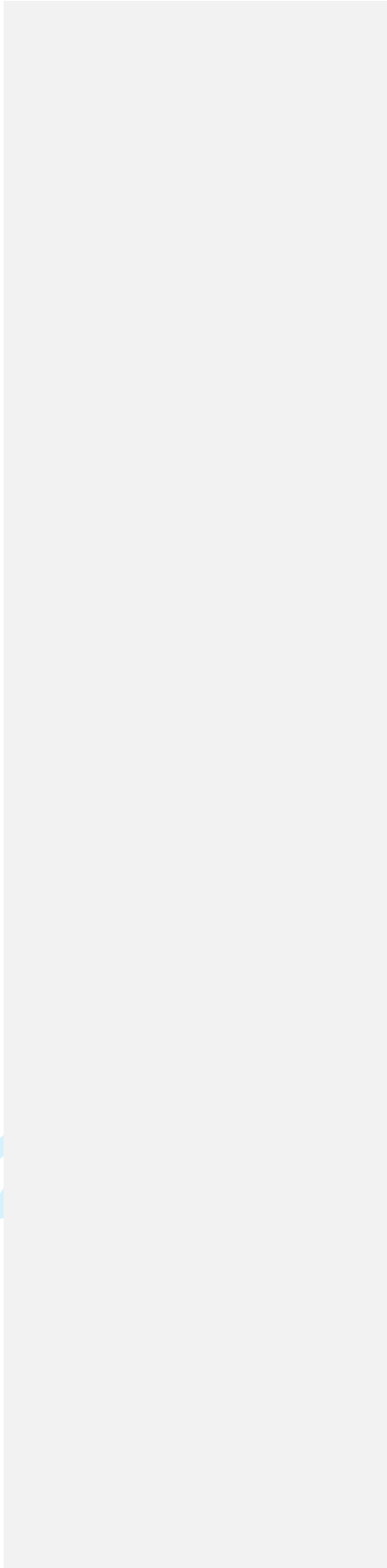
43
44 **Data sharing statement** No additional data are available.
45
46

47
48
49 **Competing interests:** None
50
51
52
53
54
55
56
57
58
59
60

10 REFERENCES

- 11 1. Centers for Disease Control and Prevention (CDC). Web-based Injury Statistics Query
12 and Reporting System (WISQARS). Available at:
13 <http://www.cdc.gov/injury/wisqars>. Accessed July 1, 2012.
- 14 2. Janssens L, Gorter JW, Ketelaar M, Kramer WLM, Holtslag HR. Long-term health
15 condition in major pediatric trauma: a pilot study. *Journal of Pediatric Surgery*
16 2009;44(8):1591-600.
- 17 3. Centers for Disease Control and Prevention. Prevention Status Report. Available at
18 <http://www.cdc.gov/stltpublichealth/psr>. Accessed January 31, 2014.
- 19 4. European Child Safety Alliance. Child Safety Report Cards. Available at:
20 <http://www.childsafetyeurope.org/reportcards/index.html>. Accessed January 31, 2013.
- 21 5. Gittelman MA, Pomerantz WJ. Starting a pediatric emergency department Safety
22 Resource Center. *Pediatric annals* 2009;38(3):149-55.
- 23 6. Posner JC, Hawkins LA, Garcia-Espana F, Durbin DR. A randomized, clinical trial of
24 a home safety intervention based in an emergency department setting. *Pediatrics*
25 2004;113(6 I):1603-08.
- 26 7. Gittelman MA, Pomerantz WJ, Laurence S. An emergency department intervention to
27 increase booster seat use for lower socioeconomic families. *Academic emergency*
28 *medicine : official journal of the Society for Academic Emergency Medicine*
29 2006;13(4):396-400.
- 30 8. Brown RL. Epidemiology of injury and the impact of health disparities. *Curr Opin*
31 *Pediatr* 2010;22(3):321-5.

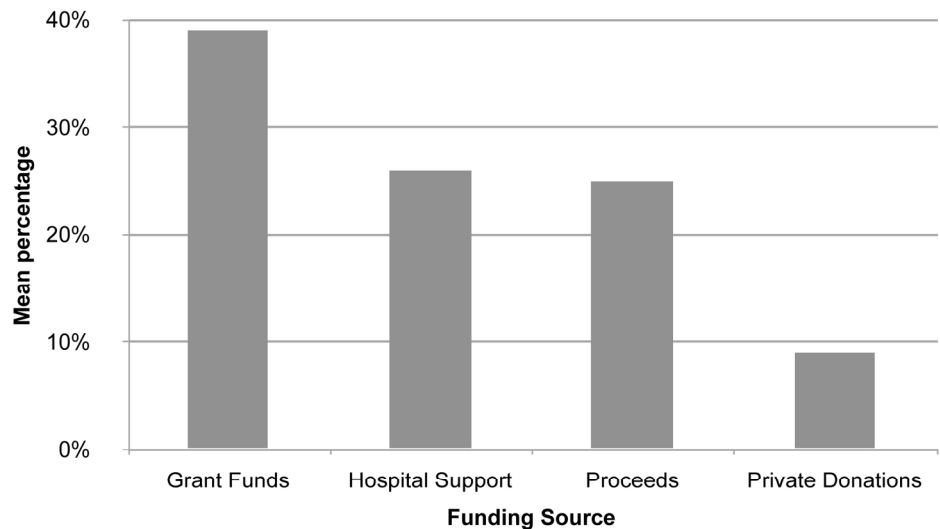
- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
9. NACHRI. All Children Need Children's Hospitals. 3rd ed.
<http://www.childrenshospitals.net>, 2007.
10. Gittelman MA, Pomerantz WJ, Frey LK. Use of a safety resource center in a pediatric emergency department. *Pediatric emergency care* 2009;25(7):429-33.
11. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of biomedical informatics* 2009;42(2):377-81.
12. Gielen AC, McKenzie LB, McDonald EM, Shields WC, Wang MC, Cheng YJ, et al. Using a computer kiosk to promote child safety: results of a randomized, controlled trial in an urban pediatric emergency department. *Pediatrics* 2007;120(2):330-9.
13. Edmonds S, Arbogast KB, Duchossois GP, Zonfrillo MR. Usage Characteristics of a children's hospital safety center. *Pediatric Academic Societies' Annual Meeting*. Washington, D.C. , 2013.
14. Berry LL, Mirabito AM, Baun WB. What's the hard return on employee wellness programs? *Harv Bus Rev* 2010;88(12):104-12, 42.
15. McDonald EM, Solomon B, Shields W, Serwint JR, Jacobsen H, Weaver NL, et al. Evaluation of kiosk-based tailoring to promote household safety behaviors in an urban pediatric primary care practice. *Patient education and counseling* 2005;58(2):168-81.



For peer review only

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Distribution of funding sources for Safety Resource Centers
159x91mm (300 x 300 DPI)

review only