Results and Lessons from the Collision Auto Repair Safety Study 2007-2014

NIOSH grant R01 OH 009086
Study Goals

1) Test a health and safety intervention in small collision repair businesses

   Intervention activities:
   - Shop evaluation
   - Training
   - Safety program templates
   - Medical clearance for respirator users
   - Respirator fit test
   - Newsletters, workshops, consultation services

2) Evaluate the sustainability of changes

   Intervention activities:
   - 0-3 reminder postcards
Study Overview

Baseline shop visit

Owner selects items to improve

Shop Improvement Plan

1 year shop visit

2 year shop visit

Active phase

Passive phase
Shop Survey — 92 questions

Question ratings:
- Critical (c)
- Highly important (hi)
- Important (i)
- Other (o)

Safety topics (53 q):
- Facility and equipment safety (11 c + 18 hi + 4 i)
- Written safety documentation and records (10 hi + 2 i + 1 o)
- Personal protective equipment (7 hi)
Shop Improvement Plan

- At least 30% of the recommendations must be selected
- 80% of the items selected - critical and highly important
- Deadlines for completion: 4 quarters
- Follow-up: quarterly

Example:
- 35 recommendations on report
- 11 recommendations chosen for implementation
- 8 critical and highly important items
Study Participants

- 49 shops enrolled (Nov 2009 – May 2011)
- 45 shops participated in the year 1 assessment
- 33 shops participated in the year 2 assessment
  - Business size:
    - 4 employees or less – 10 shops (30%)
    - 5 to 10 employees – 17 shops (52%)
    - 11 to 29 employees – 6 shops (18%)

No difference in demographics, baseline or year 1 scores between the 33 shops and the other 12
Research Questions

- How did health and safety change during the passive phase?
- What are the health and safety issues most likely to change?
- How important was the Shop Improvement Plan?
- Did reminder postcards help?
- What factors influence health and safety in collision shops?
Q1: How did health and safety scores change during the passive phase?

% deficient items = \frac{\# \ text{deficient items}}{\# \ text{items eligible for evaluation}}

<table>
<thead>
<tr>
<th>Category</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility and equipment safety</td>
<td></td>
<td></td>
<td>-1%</td>
</tr>
<tr>
<td>Written safety documentation and records</td>
<td></td>
<td></td>
<td>+4%</td>
</tr>
<tr>
<td>PPE</td>
<td></td>
<td></td>
<td>-6%</td>
</tr>
</tbody>
</table>

October 26, 2017 - USE 2017 – Denver, CO
## Q2: What are the health and safety issues most likely to change?

### Facility and equipment safety

<table>
<thead>
<tr>
<th>Item</th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFCI outlets are present in areas where water is used.</td>
<td>56</td>
<td>89(^a)</td>
<td>92(^b)</td>
</tr>
<tr>
<td>Electrical panels have labeled breakers.</td>
<td>64</td>
<td>76</td>
<td>88(^b)</td>
</tr>
<tr>
<td>Extension cords are not used in place of permanent wiring.</td>
<td>27</td>
<td>64(^a)</td>
<td>67(^b)</td>
</tr>
<tr>
<td>Containers for flammable liquids are grounded when liquid is transferred.</td>
<td>38</td>
<td>59</td>
<td>55</td>
</tr>
<tr>
<td><strong>O2 cylinders are stored away from flammable and combustible materials and gases when not on an oxyacetylene cart.</strong></td>
<td>63</td>
<td>67</td>
<td>63</td>
</tr>
<tr>
<td>The paint mixing room has a working ventilation system.</td>
<td>72</td>
<td>66</td>
<td>69</td>
</tr>
<tr>
<td>Emergency exits are not locked from inside.</td>
<td>76</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td><strong>The lights present in the paint booth are explosion proof.</strong></td>
<td>97</td>
<td>94</td>
<td>88</td>
</tr>
<tr>
<td>There is a fire suppression system in the paint booth.</td>
<td>76</td>
<td>82</td>
<td>76</td>
</tr>
</tbody>
</table>

\(^a\) significantly different from baseline (p<0.05)

\(^b\) significantly different from baseline (p<0.05)
**Q2: What are the health and safety issues most likely to change?**

**Written safety documentation and records**

<table>
<thead>
<tr>
<th>Item</th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-to-Know training was conducted in the past 12 months.</td>
<td>6</td>
<td>67&lt;sup&gt;a&lt;/sup&gt;</td>
<td>33&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>A written hearing protection policy is present.</td>
<td>12</td>
<td>61&lt;sup&gt;a&lt;/sup&gt;</td>
<td>67&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Respirator users have been trained in the past 12 months.</td>
<td>9</td>
<td>73&lt;sup&gt;a&lt;/sup&gt;</td>
<td>42&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Respirator users have been fit-tested in the past 12 months.</td>
<td>9</td>
<td>73&lt;sup&gt;a&lt;/sup&gt;</td>
<td>42&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Respirator users have medical certification.</td>
<td>15</td>
<td>76&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>A written respirator program is present.</td>
<td>27</td>
<td>79&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>A written emergency action plan is present.</td>
<td>15</td>
<td>49&lt;sup&gt;a&lt;/sup&gt;</td>
<td>49&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>MSDS sheets are available to all employees.</td>
<td>21</td>
<td>58&lt;sup&gt;a&lt;/sup&gt;</td>
<td>58&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> significantly different from baseline (p<0.01)

<sup>b</sup> significantly different from baseline (p<0.02)

<sup>c</sup> significantly different from year 1 (p<0.02)
Q2: What are the health and safety issues most likely to change?

**Personal protective equipment**

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The use of safety glasses is required</strong></td>
<td>30</td>
<td>52</td>
<td>61&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>employees are instructed to use hearing protection whenever they</strong></td>
<td>49</td>
<td>64</td>
<td>88&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>operate compressed-air driven tools.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Body techs do not use medical grade latex gloves.</strong></td>
<td>52</td>
<td>82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Employees are required to wear a respirator every time they spray</strong></td>
<td>88</td>
<td>91</td>
<td>94</td>
</tr>
<tr>
<td><strong>inside or outside the paint booth.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety glasses are provided to employees.</strong></td>
<td>85</td>
<td>94</td>
<td>100</td>
</tr>
</tbody>
</table>

<sup>a</sup> significantly different from baseline (p=0.01)

<sup>b</sup> significantly different from baseline (p<0.02)

<sup>c</sup> significantly different from year 1 (p=0.01)
## Q3: How important was the Shop Improvement Plan?

<table>
<thead>
<tr>
<th></th>
<th>Selected for SIP</th>
<th>Not selected for SIP</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not implemented at year 1</td>
<td>% Implemented at year 2</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>29%</td>
<td>18%</td>
<td>0.001</td>
</tr>
<tr>
<td>Facility and equipment safety</td>
<td>37%</td>
<td>20%</td>
<td>0.003</td>
</tr>
<tr>
<td>Written safety documentation and</td>
<td>30%</td>
<td>12%</td>
<td>0.02</td>
</tr>
<tr>
<td>records</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal protective equipment</td>
<td>41%</td>
<td>40%</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Owners continue to use the SIP “checklist” developed during the intervention.
Q4: Did reminder postcards help?

REMINDER! The best way to maintain safe work practices is to conduct periodic workplace safety audits. More information and links are available on the Safety Information page.

- Electrical
- Jacks and Hoists
- Ladders
- Slings, Ropes, and wm_Harnesses

Call us if you have questions or need assistance: Anca Bejan (952-993-3287) or Maryellen Skan (952-993-3008)

REMINDER! The following resources are available to you at no charge:

- CARSS website
  - Training
  - Program
  - Respiratory Protection
- Respirator fit testing
- Assistance with OSHA requirements

REMINDER! The following activities must be completed every 12 months:

- Right-to-Know training (due date: ____________)
  - Isocyanates and Solvents & Acids
- Respirator training (due date: ____________)
- Fire Safety training (due date: ____________)
- Respirator fit testing (due date: ____________)
- Hearing and eyesight protection (as needed)

Call us if you have questions or need assistance: Anca Bejan (952-993-3287) or Maryellen Skan (952-993-3008)
Q4: Did reminder postcards help?

- 14 shops received 0-2 cards
- 19 shops received 3 cards

- Business safety score @ year 2: p values = 0.24-0.91

- No difference in the likelihood of requesting services based on # cards received

- 10 business requested services (respirator fit test, Right-to-Know training)

- No relationship between the date of request and date of postcard
Q5: What factors influence health and safety in collision shops?

- AASP membership
- Business size
- Shop owner age and education
- Shop owner’s years of owning the shop
- Shop owner’s years in the industry
- Number of owners (1 vs 2)

- Safety consultant – significant only @ baseline

not significant
Summary of Findings

1 year after the intervention ended, most improvements were still in place.

½ of the businesses kept up-to-date with training and respirator fit testing.

Issues related to PPE continued to improve.

The Shop Improvement Plan remained an effective tool.

Reminder postcards didn’t seem to make a difference.

Prior or current use of safety consultants influenced only baseline safety scores.
LESSONS LEARNED

- The study population
- The study partners
- The researcher
- The study activities
The Study Population

- Understand the business environment
- Trusted parties/groups/advisors
- Type of work (tools, hazards, controls)
- Sources of information (magazines, conferences)
- Beliefs related to the topic of interest (how important is it to THEM?)
- Preferred means of communication
- Demographic information
- Regulatory agencies
The Collision Shop Owner....
The Study Partners

- Business associations
- IH/safety consultants
- Regulatory agencies

CARSS - partners and collaborators

- Alliance of Automotive Service Providers (AASP – MN)
- Owner Advisory Board
- Janet Keyes, CIH and Carol Keyes, CSP
- MN OSHA Workplace Safety Consultation
- MN Pollution Control Agency

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The Researcher

- Credentials + credibility
- Technical knowledge specific to the industry
- Ability and willingness to help with other issues
- Ability to inspire trust and maintain confidentiality
- Personal characteristics: patient, empathic, polite, confident
- Clearly explain **how** the study benefits the owner, the business, and the employees
The Study Activities

- Recruiting
  - How?
  - Who? *(What’s in it for YOU?)*

- IRB clearance

- Intervention implementation
  - Flexible timelines *(business changes location)*
  - Easy to follow instructions for owners/workers
  - Be in the shop as long as needed
  - Incentives (!)
  - Follow-up & Progress Report

- Marketing *(visibility in the community/articles/meetings)*
In Conclusion...

✓ Meet the needs expressed by business owners/organization
✓ Test your intervention protocol (field work)
✓ Ask owners to commit to making improvements
✓ Be flexible
✓ Plan ahead
✓ Present your findings – give future directions
✓ Don’t take it personally when progress is not made
✓ Evaluate your success (what worked, what didn’t)
Thank You!

Participating business owners and employees

NIOSH grant R01 OH 009086

David Parker, MD, MPH
Lisa Brosseau, ScD, CIH
Maryellen Skan, MPH
Min Xi, PhD
Publications


- Supplemental Personal Noise Exposure - Bejan A, Brosseau LM, Parker DL. J Occup Environ Hyg. 2011; 8; D73-4
Q3: Did the shop owners achieve their proposed goals?

Baseline

Study participation

Follow-up

Eligible

Correct

Deficient

Selected for SIP

Completed

Deficient

Not selected for SIP

Not completed

Corrected

Correct

Not corrected

No change

Deficient