



# Improving User Experience and Data Quality in Web-Based Surveys Using Custom Forms and JavaScript

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# Abstract (Condensed)

RTI has developed web-based surveys on many projects. Typically, these surveys utilize common visual elements such as radio buttons, check boxes, dropdown lists, and text boxes as well as more complex elements like likerts, sliders, and randomized grids. To enhance usability and data quality, RTI has developed custom forms for highly complex question layouts and the use of JavaScript for more interactive behaviors.

This presentation slide deck contains the text and screenshots from the live demonstration. The demonstration showcased a few of these advanced customizations to illustrate some of these unique capabilities in our web-based survey systems.

# Notes on the Demonstration

- Notes on the live demonstration:
  - The subject matter of the questions was changed to be something generic/trivial. There is little cohesion among the sections.
  - While RTI has extensive experience in making web-based surveys both mobile-friendly and 508 compliant, there was no attempt at making this demonstration meet those standards.

# Gate Questions

- Gate questions are common, where a response can send a respondent to follow-up question(s) or skip them.
- This is typically done by having the gate question on a separate form than the follow-up question(s).
- Under certain protocols it may be easier and more intuitive for the respondent to have the follow-up question(s) on the same form.
- While equivalent functionality can be achieved without customization by having the follow-up questions on separate forms, these solutions provide an enhanced user experience.
- We present 3 approaches to this.
- On the next form we have two similar gate questions with their respective follow-up questions in-line, presented as a table. Each has a follow-up question that is also a gate question. The follow-up questions are enabled/disabled as appropriate so that a respondent cannot provide a response to a question that should be "skipped."

# Gate Question #1 – Initial State

Please answer the following:

<p>1. Do you like pizza?</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes</p>	<p>What are your favorite places for pizza?</p> <input type="text" value="Enter favorite pizza places"/>	<p>Do you prefer plain pizza?</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes</p>	<p>What are your favorite toppings for pizza?</p> <input type="text" value="Enter favorite pizza toppings"/>
<p>2. Do you like chicken wings?</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes</p>	<p>What are your favorite places for chicken wings?</p> <input type="text" value="Enter favorite chicken wing places"/>	<p>How hot do you prefer your chicken wings?</p> <p><input type="radio"/> No Heat</p> <p><input type="radio"/> Mild</p> <p><input type="radio"/> Medium</p> <p><input type="radio"/> Hot</p>	<p>What are your favorite sauces for chicken wings?</p> <input type="text" value="Enter favorite chicken wing sauces"/>

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# Gate Question #1 – After Responses

Please answer the following:

<p>1. Do you like pizza?</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Yes</p>	<p>What are your favorite places for pizza?</p> <input type="text" value="Enter favorite pizza places"/>	<p>Do you prefer plain pizza?</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Yes</p>	<p>What are your favorite toppings for pizza?</p> <input type="text" value="Enter favorite pizza toppings"/>
<p>2. Do you like chicken wings?</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Yes</p>	<p>What are your favorite places for chicken wings?</p> <input type="text" value="Enter favorite chicken wing places"/>	<p>How hot do you prefer your chicken wings?</p> <p><input checked="" type="radio"/> No Heat</p> <p><input type="radio"/> Mild</p> <p><input type="radio"/> Medium</p> <p><input type="radio"/> Hot</p>	<p>What are your favorite sauces for chicken wings?</p> <input type="text" value="Enter favorite chicken wing sauces"/>

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# Gate Question #2

- Next we present two functionally identical forms. Each has 3 questions asking the respondent to verify preloaded information for both a primary and secondary contact person. If the respondent responds with "no" for any of these, then a follow-up question appears on the form to collect the updated information. As these 3 questions relate to the same contact it was preferable to have them on the same form.
- In the instance where a preloaded value is missing, it makes no sense to ask if it is correct. In this situation, instead of asking the yes/no "is this correct" question, we hide that question and immediately present the follow-up question to collect this information.

# Gate Question #2 – Preloads

Preloaded information:

Primary contact:

Name:	Jack Reacher
Relationship:	Brother-in-Law
Phone:	888-555-1111
Email:	jack.n.reacher@gmail.com

Secondary contact:

Name:	Jason King
Relationship:	** Missing **
Phone:	866-555-1234
Email:	** Missing **

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# Gate Question #2a – Initial State

Primary contact: Jack Reacher

1. Our records indicate that the relationship your primary contact has with you is **Brother-in-Law**. Is that correct?

Yes

No

Clear

2. Is their phone number **888-555-1111**?

Yes

No

Clear

3. Is their email address **jack.n.reacher@gmail.com**?

Yes

No

Clear

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# Gate Question #2a – After Gate Question Responses

Primary contact: Jack Reacher

1. Our records indicate that the relationship your primary contact has with you is **Brother-in-Law**. Is that correct?

Yes

No

Clear

2. Is their phone number **888-555-1111**?

Yes

No

Clear

2a. What is the best phone number for your primary contact?

Phone number

3. Is their email address **jack.n.reacher@gmail.com**?

Yes

No

Clear

3a. What is the email address for your primary contact?

Email address

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# Gate Question #2b – Initial State

Secondary contact: Jason King

4a. What is your secondary contact's relationship to you?

Relationship

5. Is their phone number 866-555-1234?

Yes

No

Clear

6a. What is the email address for your secondary contact?

Email address

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# Gate Question #2b – After Gate Question Responses

Secondary contact: Jason King

4a. What is your secondary contact's relationship to you?

Relationship

5. Is their phone number 866-555-1234?

Yes

No

Clear

5a. What is the best phone number for your secondary contact?

Phone number

6a. What is the email address for your secondary contact?

Email address

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# Gate Question #3

- This next example also has follow-up questions appearing on the same form. This example showcases that different response options for the gate question have different follow-up questions. Instead of the follow-up question appearing after the gate question, it appears in the response option list, after the selected option.

# Gate Question #3 – Initial State

What is your favorite sport to watch on TV?

- None
- Baseball
- Football
- Basketball
- Ice Hockey
- Golf
- Other

Clear

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# Gate Question #3 – After Response

What is your favorite sport to watch on TV?

- None
- Baseball
- Football
- Basketball
- Ice Hockey

What is your favorite ice hockey team?

- Golf
- Other

Clear

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# Gate Question #3 – After Different Response

What is your favorite sport to watch on TV?

- None
- Baseball
- Football

Which level of football do you prefer to watch?

- College
- Professional

Clear

- Basketball
- Ice Hockey
- Golf
- Other

Clear

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# Timers/Stopwatches

- For one medical school protocol, in order to enhance clinic physiological sensory protocol adherence and quality measures and to enhance staff efficiencies, we embedded timers directly onto the form.
- Equivalent functionality could have been achieved by the interviewer using an actual stopwatch, or a timer app on a smart phone/tablet. Embedding the timers on the form itself eases the burden on the clinic personnel and increases the likelihood of collecting accurate data.
- The next form is for an interviewer to capture a patient's temporal pain measures (threshold and tolerance). A button click starts a timer (stopwatch) when the patient places their hand in cold water, and the current time is captured. Another button will capture the stopwatch value when the patient first mentions the onset of pain (threshold).
- Another button will capture the stopwatch value when the patient withdraws their hand from the water (tolerance). This button click also starts a second timer so that a follow-up question can be asked every 30 seconds. Stopping this timer captures the current time to denote the end of the test.

# Timers #1 – End of Test

Start the stopwatch as soon as participant's hand is submerged in the cold water.

Test Start Time:

Test End Time:

Measurement	Latency (s)	Max. Cold Pain Intensity (NRS 0-100)	Max. Cold Pain Unpleasantness (NRS 0-100)
Cold Pain Threshold (first sensation of pain)	<input type="text" value="01:03"/>		
Cold Pain Tolerance (hand withdrawal)	<input type="text" value="02:20"/>	<input type="text" value="90"/>	<input type="text" value="90"/>

Rate the intensity of the pain in your hand now from 0-100.

Rate the unpleasantness in your hand now from 0-100.

Seconds:

Time After Withdrawal (s)	Pain Intensity (NRS 0-100)	Pain Unpleasantness (NRS 0-100)
30	<input type="text" value="90"/>	<input type="text" value="90"/>
60	<input type="text" value="80"/>	<input type="text" value="80"/>
90	<input type="text" value="70"/>	<input type="text" value="70"/>
120	<input type="text" value="60"/>	<input type="text" value="60"/>
150	<input type="text" value="30"/>	<input type="text" value="30"/>
180	<input type="text" value="10"/>	<input type="text" value="10"/>

# Timers #2

- The next form is for a clinic technician to perform a cuff algometry test. With this test the patient wears a device on their calf that can be set to particular pressures. This test is designed to have the device pressurized for 20 seconds, deflated for 40 seconds, then pressurized to a higher pressure for 20 seconds, and so on. The form contains a table where scores can be entered for each pressure setting. The form will display "PRESSURE" and "REST" in accordance to the times to help the clinic technician keep pace with the test.
- For the purpose of this demo the intervals were shortened to 5 seconds of pressure and 5 seconds of rest, and the number of intervals was also reduced.

# Timers #2 – During Test

- Use the stopwatch for correct timing.
- Pressure duration = 5 seconds
- Time between pressures = 5 seconds
- Record ratings in the table below.

00:20

Start Stopwatch

Stop Stopwatch

Familiarization (Dominant Calf)			
Time	Intensity	0-100 NRS Rating	
0:00	20	<input type="text" value="25"/>	REST
0:10	40	<input type="text" value="40"/>	REST
0:20	60	<input type="text"/>	PRESSURE
0:30	80	<input type="text"/>	
0:40	100	<input type="text"/>	
0:50	120	<input type="text"/>	

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# Multiple Modes

- For one client we developed instruments capable of supporting both self-administered and interviewer-led modes despite the two modes having:
  - different question wording,
  - different response options, and
  - separate validations.
- This was accomplished by having one version of each of these instruments that would adapt depending on the mode (self-administered and interviewer-led). This allowed for the ability for a respondent to switch modes within an administration (e.g., respondent burden, sensitive questions).

# Multiple Modes – Select Mode

Select the mode for this next section:

Self-Administered (SAQ)

Interviewer-Led

Clear

The differences between the modes:

- Interviewer mode may have additional text in blue for the interviewer to use to prompt the respondent, if necessary.
- SAQ mode could possibly have additional text (in red) for clarification.
- Select one/select all that apply questions in interviewer mode had two additional response options (Don't Know and Refused) that were not available in SAQ mode.
- All questions in interviewer mode required a response. Questions left unanswered in SAQ mode would prompt produce a soft prompt.

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# Multiple Modes – Radio Button List

## SAQ

1. How often do you listen to the radio when you are driving your personal vehicle?

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All or almost all of the time

Clear

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## Interviewer

1. How often do you listen to the radio when you are driving your personal vehicle?

[IF NEC: None of the time, A little of the time, Some of the time, Most of the time, All or almost all of the time.]

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All or almost all of the time
- [REFUSED]
- [DON'T KNOW]

Clear

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# Multiple Modes – Likert (SAQ)

2. How often would you say you connect to the following?

	None of the time	A little of the time	Some of the time	Most of the time	All or almost all of the time
<b>a. Facebook</b> Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b. YouTube</b> Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c. Instagram</b> Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d. Tiktok</b> Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e. Netflix</b> Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>f. Hulu</b> Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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# Multiple Modes – Likert (Interviewer)

2. How often would you say you connect to the following?

[IF NEC: None of the time, A little of the time, Some of the time, Most of the time, All or almost all of the time.]

	None of the time	A little of the time	Some of the time	Most of the time	All or almost all of the time	[REFUSED]	[DON'T KNOW]
a. Facebook - [IF NEC: none, a little, some, most, or almost all?] Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. YouTube Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Instagram Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Tiktok Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Netflix Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Hulu Clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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# Multiple Modes – Numeric Entry

## SAQ

3. How many hours do you estimate you spend on-line in a week?

NUMBER OF HOURS *(Enter a number between 0 and 168)*

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3. How many hours do you estimate you spend on-line in a week?

*[IF NEC: You can use any number between 0 and 168 to answer.]*

NUMBER OF HOURS

*If DON'T KNOW, enter "-98"*

*If REFUSED, enter "-97"*

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## Interviewer

# Multiple Modes – Custom Form (SAQ)

## 4. Describe an OTC medication you currently take.

Medication name (include strength, if any)

Do you take this medication on a regular basis, or as needed?

- Select - 

What kind of medication is this?

- Select - 

How much do you take each time?


Dosage Amount

Dosage unit

How often do you take this? (for example, 3 times per day, 1 time per week, etc.)

Times


Per

- Select - 

For how long have you been taking this? (for example, 3 days, 2 weeks, 5 years, etc.)

For (Number)

Unit

- Select - 

Why do you take this medication?

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# Multiple Modes – Custom Form (Interviewer)

## 4. Describe an OTC medication you currently take.

Medication name (include strength, if any)

Do you take this medication on a regular basis, or as needed?

What kind of medication is this?

How much do you take each time?

**Dosage Amount** **Dosage unit**

If DON'T KNOW, enter "-98"

If REFUSED, enter "-97"

How often do you take this? (for example, 3 times per day, 1 time per week, etc.)

**Times** **Per**

If DON'T KNOW, enter "-98"

If REFUSED, enter "-97"

For how long have you been taking this? (for example, 3 days, 2 weeks, 5 years, etc.)

**For (Number)** **Unit**

If DON'T KNOW, enter "-98"

If REFUSED, enter "-97"

Why do you take this medication?

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# Multiple Modes

- Equivalent functionality could have been achieved without customization in a couple of different manners.
- One possibility would be to have two sets of the same questions in the instrument, one programmed for each mode.
  - A gate question at the beginning to indicate which mode and then the respondent would be sent through one set or the other.
  - Each question exists twice which increases maintenance.
  - The dataset would be sparse as each response set would be half empty.
  - As each question appears twice in the instrument, it would need to have to two different names. There would need to be some manipulation in order to meld the Interviewer and the SAQ responses into one cohesive dataset for analysis (for example, having Q1 for both Interviewer and SAQ in the same variable in the dataset).

# Multiple Modes

- Another possible approach would be to have two separate instruments, one for each mode.
  - This solves the dataset concerns mentioned previously, but each question still exists twice which increases maintenance.
- The customized solution presented here proved to be a superior option to these alternatives.

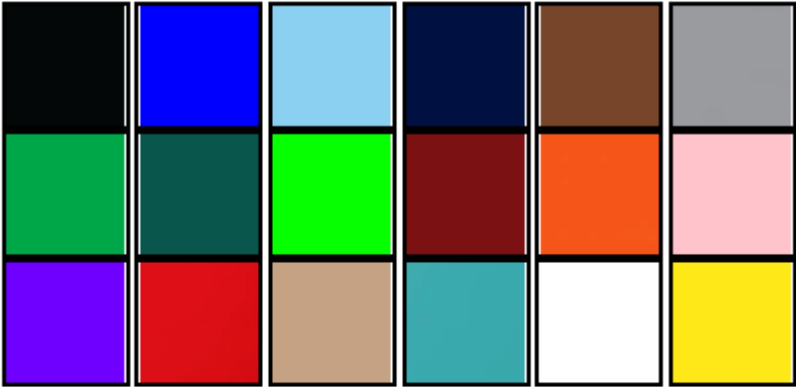
# Clickable Images

- In most instances listing response options as text is sufficient. However, there are situations where having an image is preferable. And when an image is presented and text is not necessary then it makes sense to proceed without text and to have the image be selectable.
- On the next form we ask the respondent to pick up to 3 colors. Showing the actual color is preferable then just the name of the color.
- On the form after that we ask the respondent to pick up to 3 colors from the same set but the three selected on the first form are no longer available.
- Equivalent functionality can be achieved without customization. For example, the response options for colors could have be presented by name.

# Clickable Images #1 – Initial State

Please select (at most 3) colors below that you think would be the best exterior color for a car.

1st Best Fit	2nd Best Fit	3rd Best Fit
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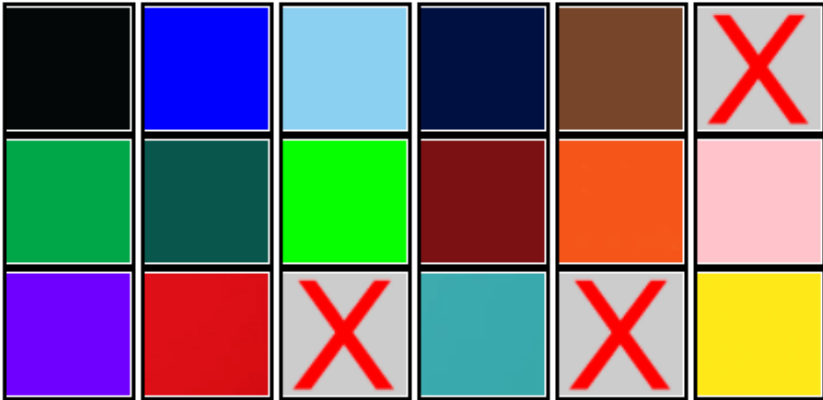
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# Clickable Images #1 – After Response

Please select (at most 3) colors below that you think would be the best exterior color for a car.

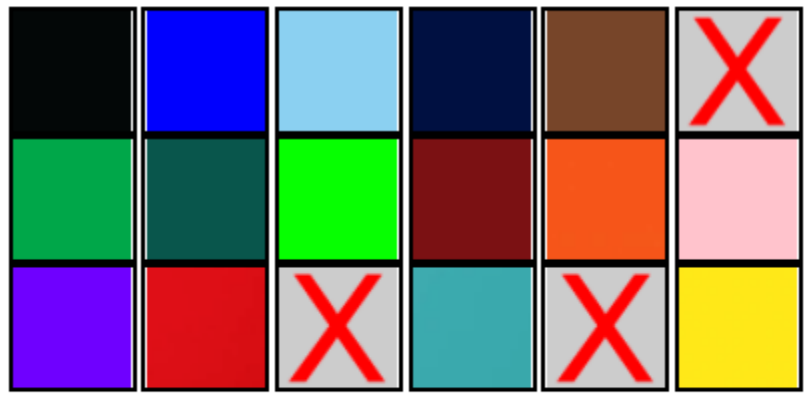


Next >

# Clickable Images #2

Now please select (at most 3) colors below that you think would be the worst exterior color for a car.

1st Worst Fit	2nd Worst Fit	3rd Worst Fit
---------------	---------------	---------------



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# Clickable Maps

- There are situations where allowing the respondent to click within an image to select a portion of that image is optimal.
- Consider the following two examples where we have the body map first configured to be a "select all that apply," and then as a "select one."
- The "select all that apply" map was used as a gate question, where subsequent module(s) were launched based upon the results of an algorithm that calculated scores using tagged anatomical area(s).
- Equivalent functionality can be achieved without customization. The body maps could have been a static image, with the response options presented as a list of checkboxes (select all that apply) or radio buttons (select one) below the image that correspond to the labels on the image.

# Clickable Maps

Map1. Please indicate all areas where you feel chronic pain:

front - no pain

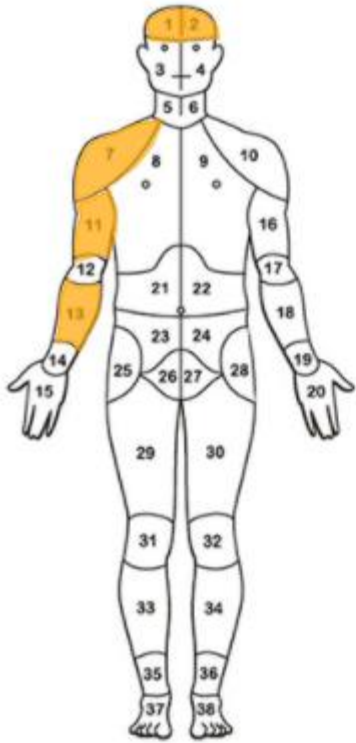
rear - no pain

Right

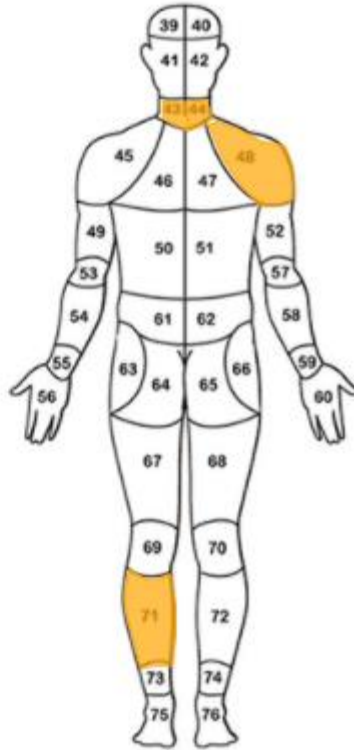
Left

Left

Right



Front



Rear

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# Contact

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