

WISER User's Guide

Version 4.1



Wireless Information System
for Emergency Responders



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Prepared for:
National Library of Medicine
Specialized Information Services
National Institutes of Health – DHHS
6707 Democracy Blvd, Suite 510
Bethesda, MD 20892
<http://www.sis.nlm.nih.gov>



Prepared under contract by:
Next Century Corporation
8101 Sandy Spring Road
Laurel, Maryland 20707
301.939.2600
<http://www.nextcentury.com>



Table of Contents

1. Introduction	3
1.1. Features	3
1.2. System Requirements	3
1.3. Installing WISER	3
1.4. Disclaimer	3
1.5. Software Used by WISER	4
2. Using WISER	5
2.1. Main Page	5
2.1.1. Setting the User Profile	5
2.1.2. Known Substance	6
2.1.2.1. Search by Name	8
2.1.2.2. Search by Identifier	8
2.1.2.3. Filter by Substance Type	8
2.1.3. Unknown Chemical Substance	9
2.2. Data Page	9
2.3. Identifying Unknown Chemicals	13
2.3.1. Identify Substance Page	14
2.3.2. Properties Page	15
2.3.3. Symptoms Page	18
2.3.4. Categories Page	21
2.3.5. NFPA 704 Page	23
2.3.6. Search Results	24
2.4. Miscellaneous	27
2.4.1. Navigation	27
2.4.2. Help Menus	28
3. Tutorial	29
3.1. Known Substance	29
3.2. Unknown Chemical Substance	31
4. About NLM	36

1. Introduction

The Wireless Information System for Emergency Responders (WISER) is a system concept for providing First Responders at the scene of hazardous material incidents – chemical, biological, or radioactive – with integrated information, decision support, and communications. WISER provides critical chemical information quickly and conveniently on mobile devices, such as PDAs, tablet computers, field laptops, mobile phones, and mobile data terminals. It aids in the identification of unknown chemicals and, once the chemical is identified, provides guidance on immediate actions necessary to save lives and protect the environment. Substance information and identification properties come from the Hazardous Substances Data Bank (HSDB), developed and maintained by the National Library of Medicine.

WISER currently exists as a standalone PDA application for Pocket PC and Palm OS devices; this document describes the Palm OS version. WISER contains HSDB information and decision support logic for 400+ substances (future versions will provide access to more substances). The substances were chosen based on First Responder inputs, degree of chemical hazard, and historical frequency of incidents. The WISER application assists First Responders in rapidly determining the substance involved and gives the First Responder critical information regarding the substance, allowing them to take the necessary immediate actions to minimize the effects of the hazmat incident.

1.1. Features

- Access to data from the Hazardous Substance Data Bank, covering basic, physical, hazardous material, medical, and environmental areas
- Multiple substances, chosen based on First Responder inputs, degree of chemical hazard, and historical frequency of incidents
- Substance identification support, based on physical properties and patient symptoms

1.2. System Requirements

For system requirements, please see the README that is included in the WISER installation, or in the download section of the [WISER website](#).

1.3. Installing WISER

For instructions on installing and uninstalling WISER, please see the README that is included in the WISER installation, or in the download section of the [WISER website](#).

1.4. Disclaimer

The U.S. Government does not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed.

It is not the intention of NLM to provide specific medical advice to the public, but rather to provide users with information to better understand their health.

NLM does not endorse or recommend any commercial products, process, or services.

1.5. Software Used by WISER

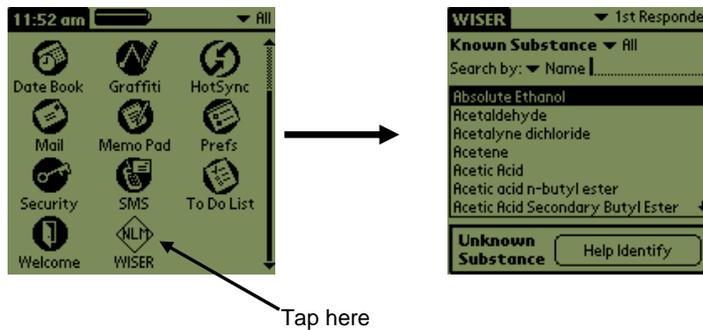
The WISER application code and WISER installer use software from several other software packages. The licenses for these software packages are available in the file DisclaimerAndLicenses.txt which is included with the WISER distribution. The software packages used by WISER are:

- Inno Setup - copyright by Jordan Russell. See: <http://www.jrsoftware.org/isinfo.php>. Inno Setup is used to create the Windows Installer.
- Palm Auto Installer - copyright by Jim Douglas Computing. See: <http://www.jim-douglas.com>. The Palm Auto Installer is used by the Windows installer to place the Palm files into the install queue.
- Gnuplot - copyright by Thomas Williams, Colin Kelley. See: <http://www.gnuplot.info>. Two functions (set_tic and double_raise) from the Gnuplot code are used in the calculation of where to put ticks on the progress bar on the Search Page, the Symptoms Page, and the Properties Page.
- MathLib - copyright by Rick Huebner. See: <http://www.radiks.net/~rhuebner/mathlib.html>. A number of MathLib functions are used to perform the calculations needed by set_tic and double_raise from Gnuplot.

2. Using WISER

The WISER application is run from Application Launcher.

1. Tap the Application Launcher icon 
2. Tap the WISER icon to launch the application



The remainder of this section details the functionality on each of the pages that comprise the WISER application.

2.1. Main Page

The main page is presented upon startup of WISER or any time the up-arrow is tapped in the top right corner of one of the other pages. From here the main functionality of WISER is accessed, including:

- Setting the User Profile
- Searching for a known substances in the substance list
- Launching the functionality for identifying an unknown chemical

2.1.1. Setting the User Profile

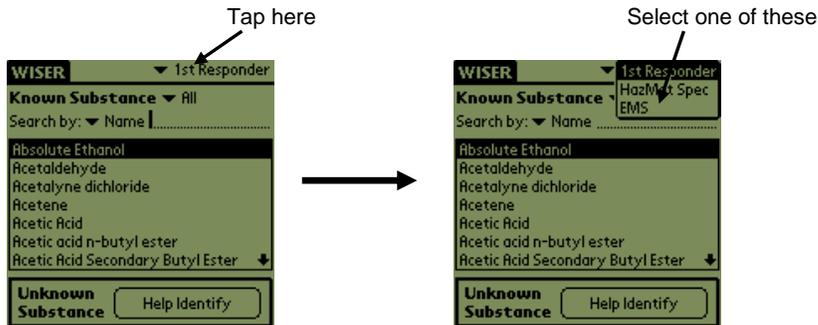
The User Profile determines how certain information is presented by WISER, tailoring the application to suit the needs of the type of user. Specifically, it controls what 'hot links' are presented on the [Data Page's](#) data menu, ensuring that the most relevant information is the most readily available.

To set the User Profile, select the option that best describes your role from the pull-down menu on the upper-right of the Main page.

As shown in the figure below, options are available for:

- 1st Responder, e.g., first engine on the scene
- Hazmat Specialist

- Emergency Medical Specialist (EMS)

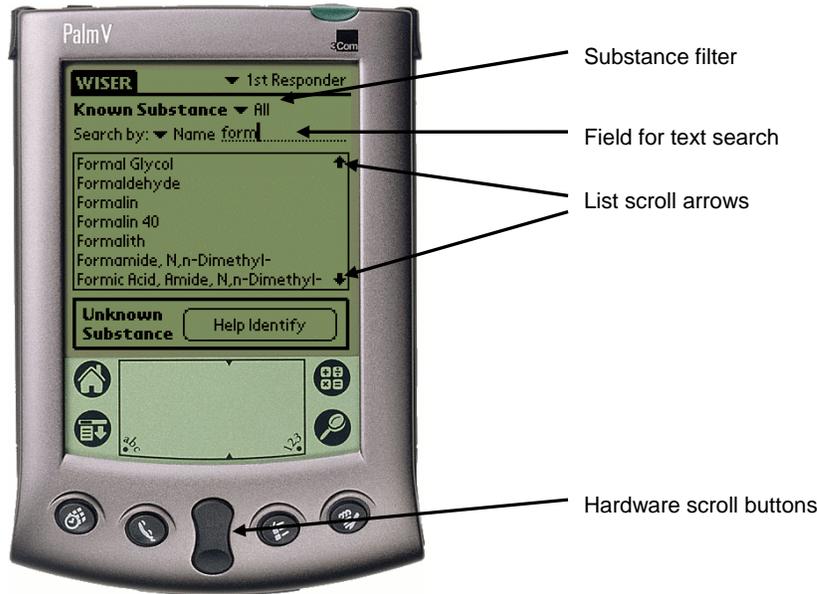


Each time WISER is started, the User Profile setting from its previous use is restored.

2.1.2. Known Substance

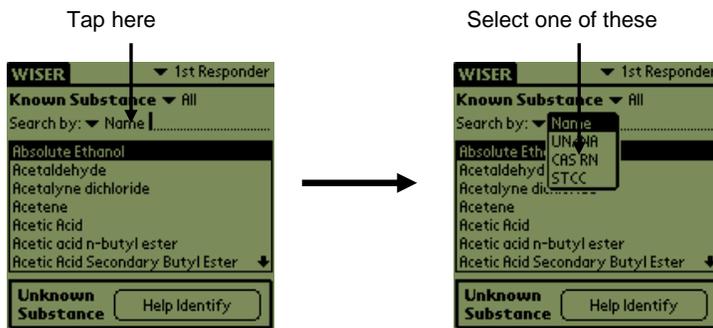
If you know what the substance is, you can locate it by any of the following methods:

- Scrolling through the list of names using the up and down arrows on the substance list
- Scrolling through the list of names using the hardware keys in the bottom center of the device
- Ordering the list by substance name or one of the substance identification numbers, where the possibilities are UN/NA number, CAS registry number, and STCC number
- Filtering based on the "type" of substance (all substances, all chemicals, all biologicals, all radiologicals)
- Performing a search by entering the name or one of the identifiers into the **Known Substance** text field



To use the **Known Substance** text field, enter Graffiti, the native Palm alphabet, or use the built-in on-screen keyboard. As you enter characters, they appear in the text field, and the list scrolls to the first matching substance. The **Search by** pull-down menu selection controls whether the substance name or an identification number should be entered, and controls the ordering of the list. The options available are as follows:

- Name: list is ordered alphabetically by name
- UN/NA: list is order by UN/NA number
- CAS: list is order by CAS registry number
- STCC: list is ordered by STCC number



Upon locating the desired substance in the substance list, tapping it displays the [Data Page](#) for that substance

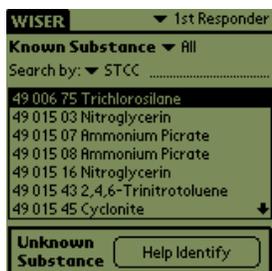
2.1.2.1. Search by Name

As shown in the figure above, when **Name** is selected from the **Search By** menu, the substance list is alphabetically sorted, and is augmented with "aliases", i.e. other names by which the HSDB substances in WISER are known.

Note that numbers and punctuation that prefix a name are ignored for sorting and search purposes. When entering text in the **Known Substance** field, start with the first letter.

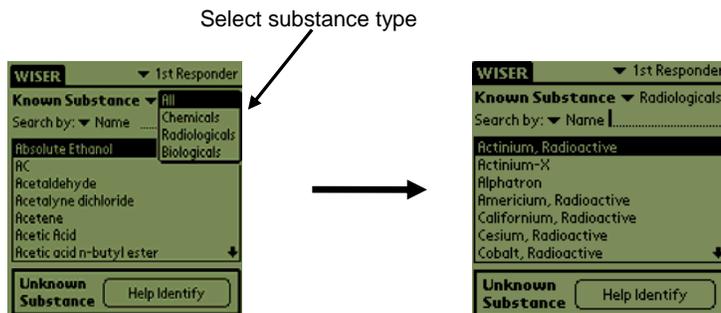
2.1.2.2. Search by Identifier

As shown in the figure below, when **UN/NA**, **CAS**, or **STCC** is selected from the **Search By** menu, the substance list contains only the HSDB substance names (no aliases), in order by the selected identification number, and each substance name is prefixed with the identification number.



2.1.2.3. Filter by Substance Type

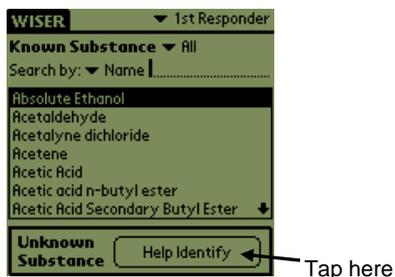
By default, the substance list includes all substance in WISER. The list can be filtered to include only a particular type of substance, e.g., chemicals, biologicals, or radiologicals.



When the list is filtered in this fashion, any subsequent searches will occur only against the filtered list.

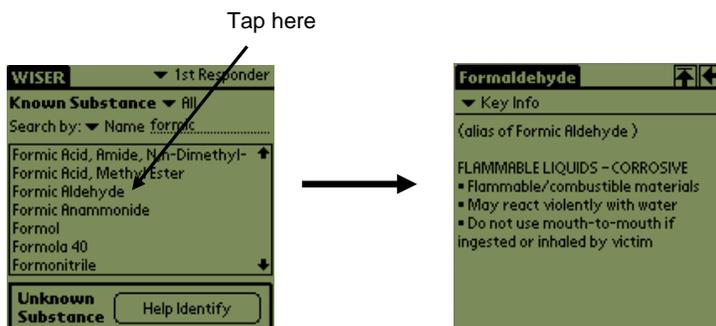
2.1.3. Unknown Chemical Substance

If you are trying to identify an unknown **chemical**, tap the **Help Identify** button to advance to the [Identify Substance](#).



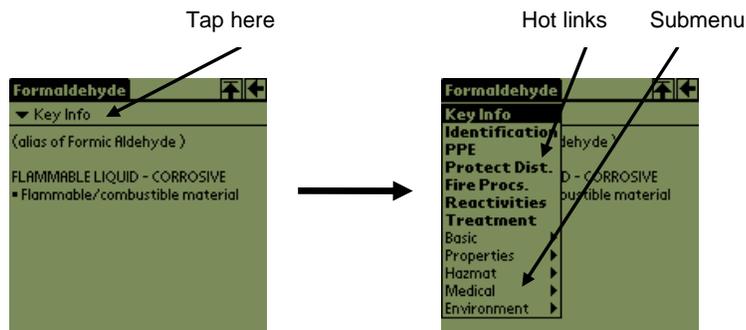
2.2. Data Page

The Data Page is presented when you tap a substance name from the [Main page](#) or from the [Search Results page](#). It is used to select and view all data that is available for the substance.



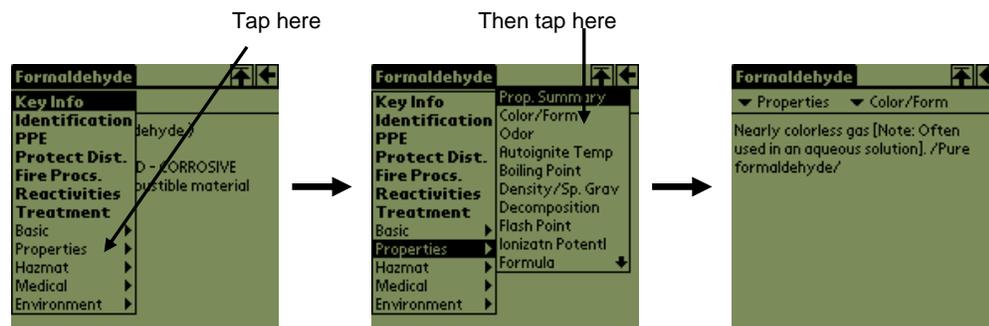
As shown above, the Data Page initially displays Key Info, a summary of the most immediate, critical aspects of a substance. If an alias of the substance was selected from the Main page, the Key Info text is preceded with the alias. In the above example, "Formic Aldehyde", an alias of the substance known in the HSDB as Formaldehyde, was chosen from the Main page's substance list.

To see additional data, tap the pull-down menu on the left (initially showing 'Key Info') as shown below to bring up a menu of 'hot links' and submenus.

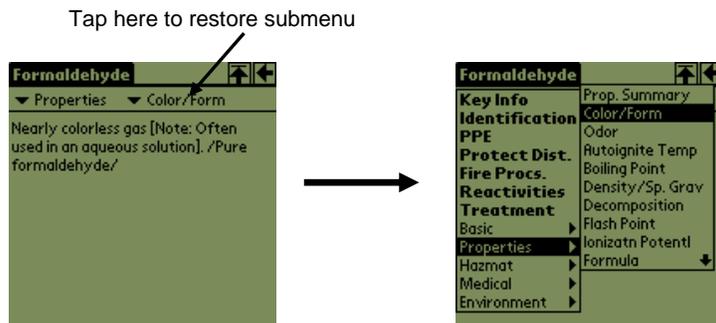


The hot links are generally duplicates of items in the submenus, but provide a quicker way to get to the most relevant information for the current user profile. What hot links are available depend on the [user profile](#) selected on the Main page and the type of substance (chemical, biological, or radioisotope).

The bottom portion of the data menu contains submenus, where each submenu represents a category of options. Tapping one of these pops up the submenu, listing the data elements in that category. As shown below, tapping a submenu item closes the menus and replaces the previous data display contents with the selected data element.



A heading bar above the data displays the menu and submenu selections. You can tap either to reopen the corresponding menu. For example, tap the submenu selection to quickly reopen the submenu and select an alternate option in that category.



The hot links that are available on the data menu for a chemical are as follows. Each is a duplicate of one of the submenus, except for those “custom” options that are noted.

- Common to all user profiles:
 - Key Info – this custom option presents the most immediate dangers or considerations for an encounter with the substance
 - Identification – this custom option provides a summary of the properties and symptoms associated with the substance; it reflects the data that is used when [searching for an unknown](#) substance
- 1st Responder
 - PPE (Personal Protective Equipment & Clothing) – also available from the Hazmat submenu
 - Protective Distance – this custom option reflects the Public Safety section of the DOT Emergency Response Guidebook – also available from the Hazmat submenu
 - Fire Fighting Procedures – also available from the Hazmat submenu
 - Reactivities & Incompatibilities – also available from the Hazmat submenu
 - Treatment Overview – also available from the Medical submenu
- Hazmat Specialist
 - Property Summary – this custom option provides a collection of select properties that are available separately under the Properties submenu – also available from the Properties submenu
 - PPE (Personal Protective Equipment & Clothing) – also available from the Hazmat submenu
 - IDLH (Immediately Dangerous to Life or Health) – also available from the Medical submenu
 - Flammable Limits – also available from the Hazmat submenu
 - NFPA Hazard Classification – also available from the Hazmat submenu

- EMS

- Treatment Overview – also available from the Medical submenu
- Health Effects – also available from the Medical submenu
- Toxicity Summary – also available from the Medical submenu
- IDLH (Immediately Dangerous to Life or Health) – also available from the Medical submenu
- NFPA Hazard Classification – also available from the Hazmat submenu

The data elements available from the submenus of the data menu when viewing a chemical are shown below. When viewing data for radioisotopes, a subset of these are available. All data elements will not necessarily be available for all substances.

Basic Information

- UN/NA/IMO identification numbers
- CAS Registry Number
- STCC Number
- Synonyms
- Substance Categories
- Molecular Formula
- Shipment Methods & Regulations
- EPA Hazardous Waste Number
- Major Uses
- Storage Conditions

Properties

- Property Summary
- Color and Form
- Odor
- Odor Threshold
- Taste
- Density/Specific Gravity
- Molecular Formula
- Molecular Weight
- Vapor Density
- Vapor Pressure
- Flash Point
- Ionization Potential
- pH
- Melting Point
- Boiling Point
- Autoignition Temperature
- Decomposition
- Polymerization
- Stability/Shelf Life
- Viscosity
- Solubility
- Other Properties

Hazmat Information

- DOT Emergency Guidelines
- Protective Distance
- WMD Response Guidelines
- NFPA Hazard Classification
- Fire Potential
- Fire Fighting Procedures
- Hazards Summary
- PPE (Personal Protective Equipment & Clothing)
- Flammable Limits
- Toxic Combustion Products
- Explosive Limits & Potential
- Reactivities & Incompatibilities
- Other Firefighting Hazards
- Other Hazardous Reactions
- Cleanup Methods
- Disposal Methods

Medical Information

- Treatment Overview
- Health Effects
- AEGL (Acute Exposure Guideline Levels)
- IDLH (Immediately Dangerous to Life or Health)
- Threshold Limit Values
- NIOSH Recommended Exposure Levels
- OSHA Standards
- Skin, Eye and Respiratory Irritations
- Other Preventive Measures
- Toxicity Summary
- Range of Toxicity

- Laboratory
- Evidence for Carcinogenicity
- Radiation Limits & Potential

Environmental Information

- Environmental Fate/Exposure Summary

- Environmental Fate
- CERCLA Reportable Quantities
- Non-Human Toxicity Values
- Ecotoxicity Values
- Soil Adsorption/Mobility
- Volatilization from Water/Soil

The data elements available when viewing a biological substance are shown below.

Basic Information

- Shipping Name/Number (UN/NA/IMO identification numbers)
- Synonyms
- Substance Categories

Properties

- Characteristics
- Type of Harm

Hazmat Information

- DOT Emergency Guidelines
- WMD Response Guidelines
- Protective Distance
- PPE (Personal Protective Equipment & Clothing)
- Emergency Response

Medical Information

- Signs and Symptoms
- Indicators
- Clinical Features
- Treatment Overview
- Routes of Exposure
- Transmission
- Diagnosis
- Prophylaxis

Environmental Information

- Occurrence
- Reservoirs
- Isolation and Decontamination
- History
- Delivery

2.3. Identifying Unknown Chemicals

Note: *This feature only supports identification of chemicals. The substances in WISER's radioisotope and biological substance lists are excluded.*

When the chemical involved in an incident is unknown, WISER can assist in identifying it. This capability is accessed via the [Help Identify](#) button on the Main page. It allows the user to select symptoms, properties, NFPA 704 hazard values, and substance categories to narrow down the list of possible substances. The symptoms are those exhibited by victims exposed to the substance, and the properties are the physical properties of the substance itself.

The help identify portion of WISER, consists of several pages, including the main progress page, a set of pages used to specify criteria about the unknown substance, and the results page.

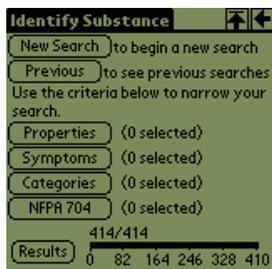
- the Identify Substance progress page used to initiate searches, check the progress of the current search, and navigate the help identify criteria
- a Properties page for indicating physical properties of the unknown substance
- a Symptoms page for entering symptoms of victims exposed to the unknown substance
- a Categories page for entering the substance categories that can be used to classify the substance
- a NFPA 704 page for entering placard values

- a Results page that displays the results of the search.

Note: The sections that follow contain references to substance counts which may change as updated versions of the WISER database are released. This would be caused by the addition of new substances or updates to the search data. The counts reflected in these sections should be used for example purposes only

2.3.1. Identify Substance Page

The Identify Substance page is used to initiate new help identify searches, access previous searches, browse the progress of the current search, and navigate within the help identify graphical interface.

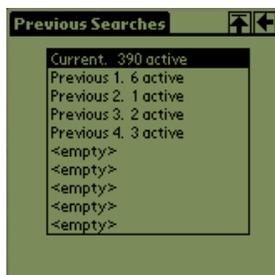


Tap on the **Symptoms**, **Properties**, **Categories**, or **NPPA 704** buttons to display the corresponding page. The number of selected items for each type of help identify criteria is displayed next to each button.

A progress bar at the bottom of the page shows the number of matching substances based on the active selections. The **Results** button opens the Search Results page to display a list of those substances.

The **New Search** button clears the selections of the current search. Those selections are saved in memory so that they can be recalled later via the **Previous** button. The progress bar resets to the maximum number of substances, and the search starts over.

A fixed number of previous searches are automatically saved and can be resumed. Tap the **Previous** button to display a list of the saved previous searches. Up to 10 previous searches are available, with each providing an indication of the number of substances matched by the search. Tap one of the previous searches in the list to replace the current search with the previous search, restoring the property and symptom selections from that search. Note that the list will display "<empty>" indications until enough searches have been performed to fill the list.



2.3.2. Properties Page

To enter physical properties of the unknown substance, navigate to the Properties page by tapping the **Properties** button on the [Identify Substance](#) page.



Similar to the Identify Substance page, the progress bar at the bottom shows the number of matching substances based on the current symptom and property selections, and the **Results** button opens the [Search Results](#) page to display a list of those substances.

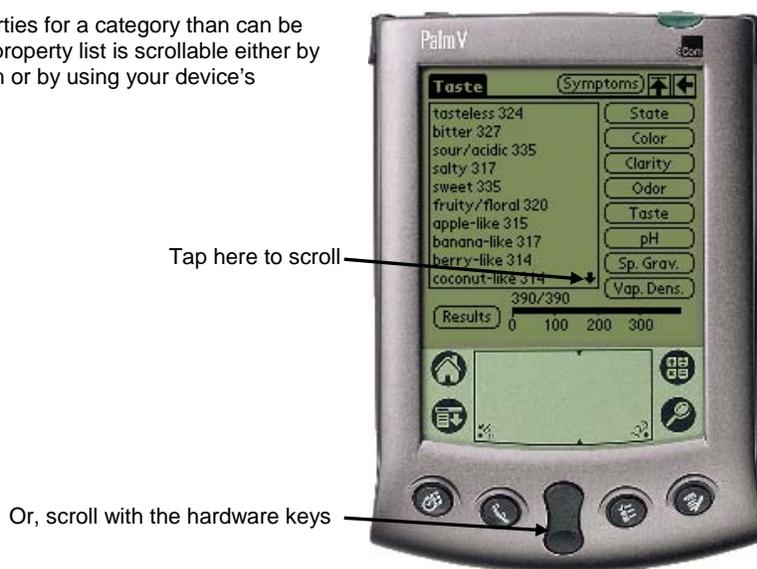
The **Progress** button returns the user to the [Identify Substance](#) page, allowing the user to peruse their progress and continue their search.

The main content of the Properties Page is column of buttons representing the categories from which properties can be selected, and a list showing the current selections. The property categories consist of:

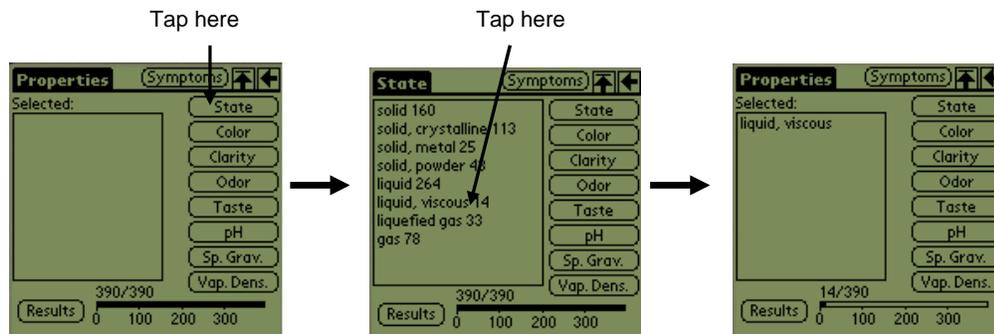
- State
- Color
- Clarity
- Odor
- Taste
- pH
- Specific Gravity (or Density)
- Vapor Density

Tapping one of the category buttons, such as 'State', displays a list of the properties in that category. Next to each property option is an indication of the number of substances having data that match that property AND each of the other property and symptom selections already made. Note that these numbers include substances that do not have sufficient data to determine whether or not there is a match. For example, in the odor category, the number displayed next to each odor option represents the number of substances that indicate that odor, plus the number of substances which don't have odor data and for which it thus can't be determined if they have the odor. This follows the general philosophy that searches should err on the side of inclusiveness rather than exclusiveness, thus reducing the risk of the unknown substance being unintentionally excluded from the search results.

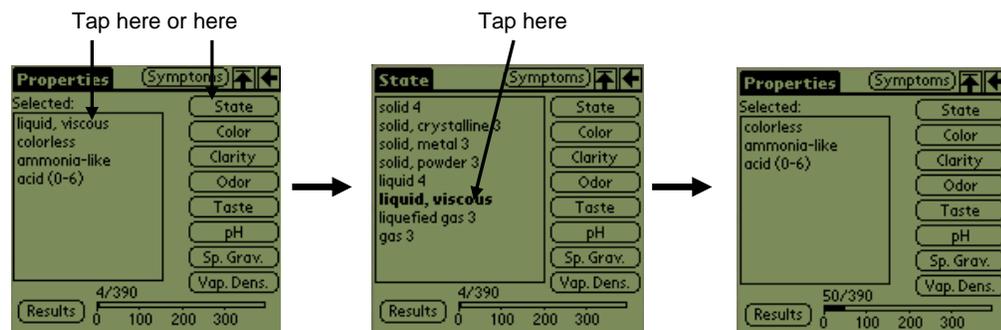
If there are more properties for a category than can be displayed at once, the property list is scrollable either by tapping the scroll button or by using your device's hardware scroll keys.



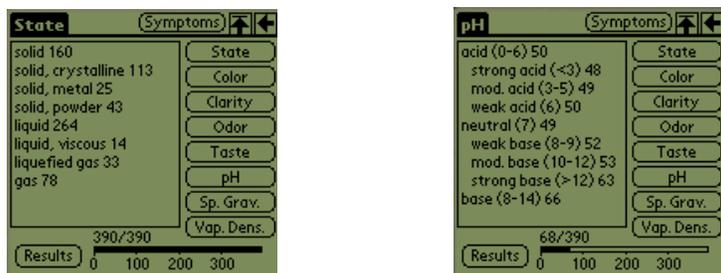
Following selection of a property, the **Selected** list on the Properties page updates to reflect the selection. The steps in selecting a property are shown below.



A property displayed in the **Selected** list can be tapped to return to the category that it was selected from, just as if the corresponding category button was tapped. The options in that category that are already selected are displayed with boldface type. Additional properties can be selected, or a boldface one can be tapped to deselect it. The following illustrates the **Selected** list following the selection of several properties, and demonstrates removal of one of those properties.



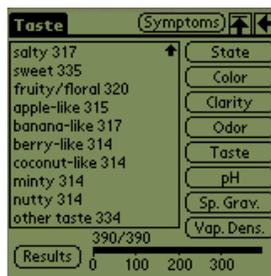
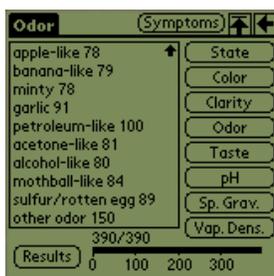
The following two property lists provide examples of related options, where one or more options are available that are more specific descriptions of a single more general option.



In the case of the State category, there is a 'solid' option, and then three additional solid options that are more specific, such as 'solid, crystalline'. The substances that will be matched by choosing the more general 'solid' option are inclusive of all the substances matched by one of the more specific options. If a more specific option is chosen, such as 'solid, crystalline', then selection of the more general 'solid' option is not necessary.

A similar situation exists for the pH category, where the broad ranges of acid and base can be selected, or a more specific ranges within those can be selected, such as "weak acid", "moderate acid", and "strong acid". In this case, indenting is used to help illustrate the relationships, and the names of the options are augmented with the numeric pH values that the named range applies to.

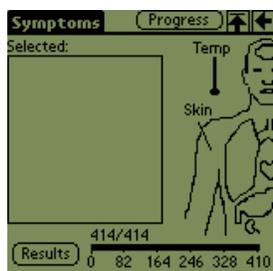
For the properties Odor and Taste, 'other odor' and 'other taste' options are available at the bottom of their respective property lists, as shown below.



The 'other odor/taste' options capture the substances that have an odor/taste, but not one that can be associated with one of the specific odors/tastes in the list. If you have odor or taste observations available, you should first examine the rest of the properties in the list, which begin with odorless/tasteless, and continue with specific odors/tastes. If a suitable match cannot be found, then resort to selecting the 'other' option at the bottom. ALL substances that include odor or taste data are included in the 'other' option; if a specific odor or taste is selected, then it would not be appropriate to also select the 'other' option.

2.3.3. Symptoms Page

To enter the symptoms of victims exposed to the unknown substance, navigate to the Symptoms page by tapping the **Symptoms** button on the [Identify Substance](#) page.



Like on the Identify Substance page, the progress bar at the bottom shows the number of matching substances based on the current symptom and property selections, and the **Results** button opens the [Search Results](#) page to display a list of those substances.

The **Progress** button returns the user to the [Identify Substance](#) page, allowing the user to peruse their progress and continue their search.

The main content of the Symptoms page is an image of a human body whose major organs can be tapped, and which identify the categories from which symptoms can be selected. To the left is a list showing the current selections. The areas of the human body that can be tapped are shown below, with the names of the symptom categories to which they correspond (if different):

- brain (neurological category)
- eyes
- ears
- nose

- mouth and throat
- lung (respiratory category)
- heart (cardiovascular category)
- stomach/kidney (gastro/urinary category)
- arm (skin category)
- thermometer (body temperature category)

Selecting one of the above areas of the body, such as the brain, displays a list of the symptoms options in the corresponding symptom category, such as 'neurological'. Next to each symptom option is an indication of the number of substances having data that match that symptom AND each of the other property and symptom selections already made.

Note that following characteristics of the symptom options:

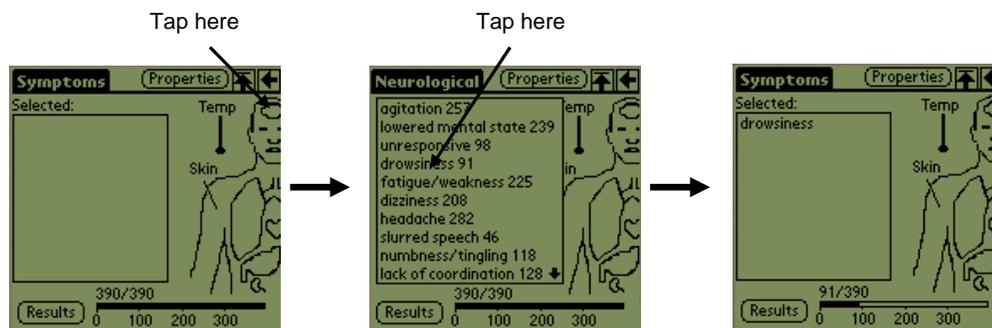
- The number of substances displayed next to the symptom options include substances that do not have sufficient data to determine whether or not there is a match. In other words, the number represents the number of substances that cause that symptom, plus the number of substances which don't have symptom data, and thus it can't be determined if they cause the symptom. This follows the general philosophy that searches should err on the side of inclusiveness rather than exclusiveness, thus reducing the risk of the unknown substance being unintentionally excluded from the search results.
- Symptoms are placed in the categories where they are observed. For example, "cyanosis/blue" is a symptom in the skin category. Cyanosis is not a skin symptom, but signs of cyanosis are evident in the skin.
- Symptoms may occur in more than one category. Sneezing, for example, can be found both in the Nose and the Respiratory categories. Other examples are Hypoxia/Cyanosis (Respiratory and Cardiovascular categories), Numbness/Tingling (Skin and Neurological categories), and Coughing/Choking (Respiratory and Mouth/Throat categories). For such options, the number of substances displayed next to the symptom in one category may not match the number displayed next to it in another category. This is because of the inclusion in those numbers of substances that don't have data. For example, the number of substances known to cause sneezing will be the same regardless of whether sneezing is chosen from the nose or respiratory category, BUT the number of substances that do not have symptom data for the nose category may be different than the number that do not have data for the respiratory category. Thus, the inclusion of these "unknowns" may produce slightly different results depending on from which category sneezing is selected.

If there are more symptoms for a category than can be displayed at once, the symptom list is scrollable either by tapping the scroll button or by using your device's hardware scroll keys.

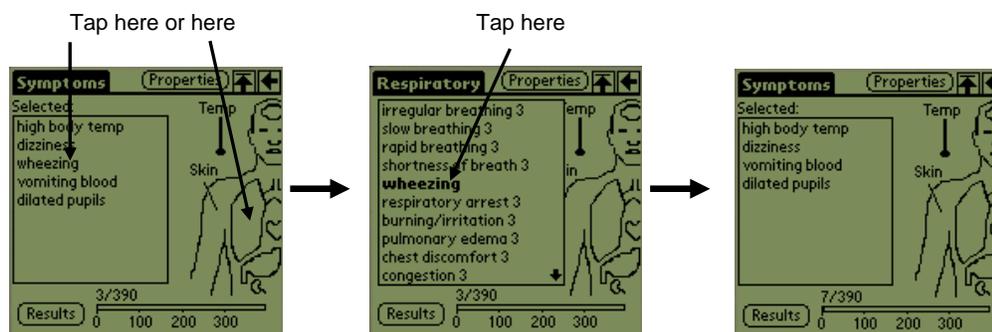


Following selection of a symptom, the **Selected** list on the Symptoms page is updated to reflect the selection.

The steps in selecting a symptom are shown below.

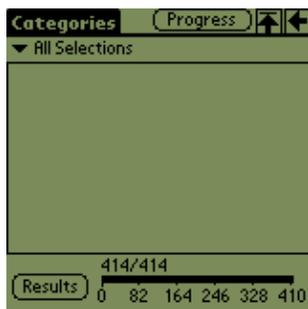


A symptom displayed in the **Selected** list can be tapped to return to the category that it was selected from, just as if the corresponding area of the body was tapped. The options in that category that are already selected are displayed with boldface type. Additional symptoms can be selected, or a boldface one can be tapped to deselect it. The following illustrates the **Selected** list following the selection of several symptoms, and demonstrates removal of one of those symptoms.



2.3.4. Categories Page

To enter categories used to classify an unknown substance, navigate to the Categories page by tapping the **Categories** button on the Identify Substance page. The Categories page allows for the selection of a set of categories or classifications that can be associated with the unknown substance. This limits the results list to only those substances that are members of the selected substance categories.



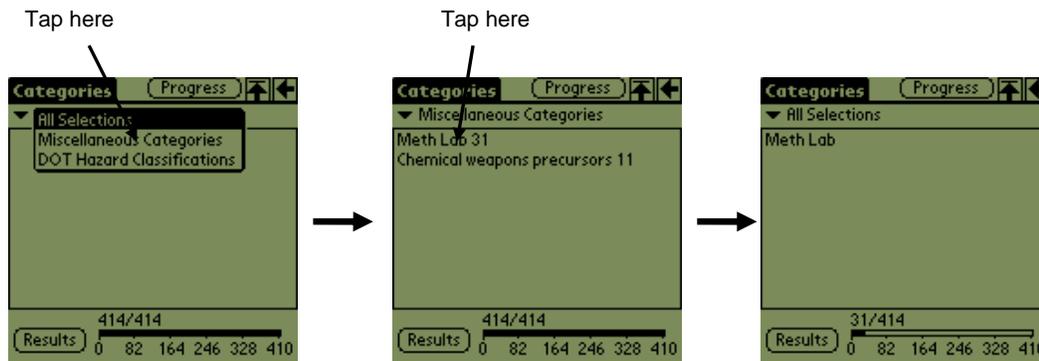
For example, if the unknown substance can be found in a methamphetamine lab, then selection of the "Meth Lab" substance category will reduce the substance list to contain only the WISER substances that are typically present in a methamphetamine lab. Consider an unknown substance that is a burning liquid. The "Class 3 – Flammable liquids" DOT Hazard classifications can be selected, and the results list will then contain only those WISER substances that are classified as flammable by the DOT.

A drop-down list is used to select either the current type of available categories or, alternatively, the current set of user selected categories. The types of available categories are as follows:

- Miscellaneous Categories, e.g. meth lab substances or chemical weapons precursors
- DOT Hazard Classifications

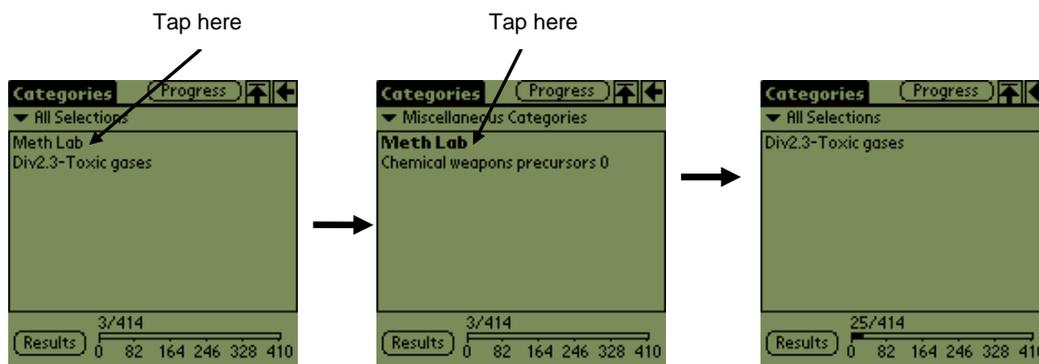
Choosing one of the available category types displays a list of the substance categories in the selected set. Next to each category option is an indication of the number of substances that match that category AND each of the other property, symptom, category, and NFPA 704 selections already made. Note that these numbers include substances that do not have sufficient data to determine whether or not there is a match.

Following selection of a property, the **All Selections** list is displayed. The steps used to select a category are shown below:



A category displayed in the All Selections list can be tapped to return to the category list that it was selected from, just as if the corresponding category type was selected from the drop-down list. The options in that category list that are already selected are displayed with boldface type.

Additional categories can be selected, or a boldface one can be tapped to deselect it. The following illustrates the **All Selections** list following the selection of multiple substance categories, and demonstrates removal of one of these categories.

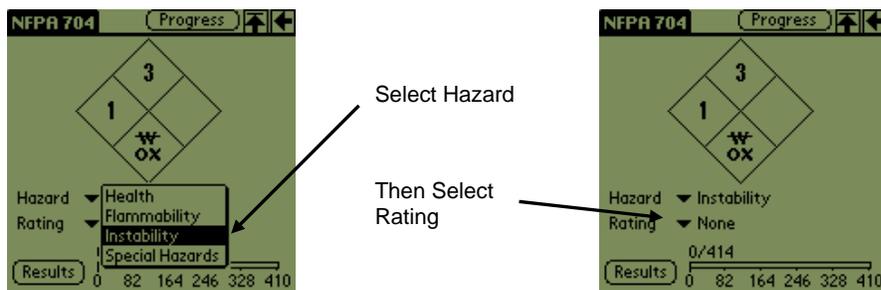


Note that in the case of the DOT Hazard Classification categories, there is a hierarchical relationship between some of the options. Namely, classes can be further broken down into divisions. For example, in addition to being able to choose the "Class 1" category, there are also individual divisions within that class that can be chosen. If choosing the more general "Class 1", the matched substances are inclusive of all of those that are also matched by each of the division 1.x categories. Note, however, that choosing each of the division options separately is NOT the same as choosing the Class option by itself. If each of the divisions were chosen, a substance would have to be a member of each one of those divisions to result in a match.

2.3.5. NFPA 704 Page

To enter hazard values from an NFPA 704 placard for an unknown substance, navigate to the NFPA 704 page by tapping the **NFPA 704** button on the [Identify Substance](#) page. This page presents the NFPA 704 hazard placard diamond that identifies the health, flammability, instability, and special hazards of a material and the degree of severity for each.

Enter the observed ratings for each NFPA hazard using the hazard and ratings drop-down lists. As each hazard rating is entered, the results are narrowed such that they include only those substances that match the chosen NFPA 704 values **AND** each of the other property, symptom, category, and NFPA 704 selections already active.

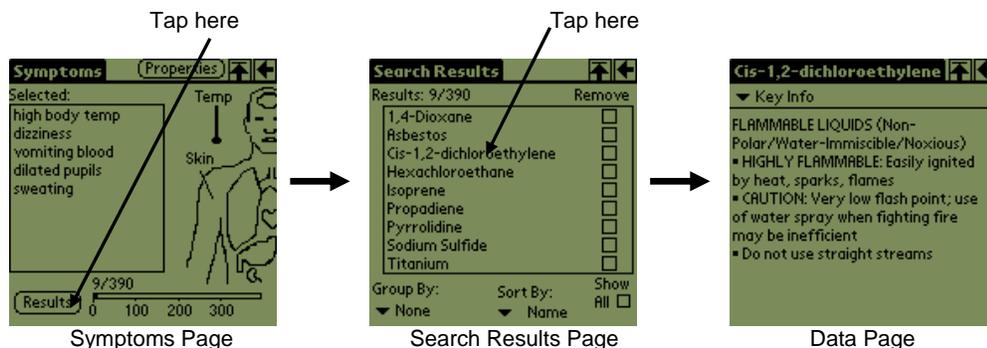


The NFPA 704 search tool supports both full and partial placard inputs. Simply leave the selection blank for any hazard diamond for which data is not available (for example, if part of the placard is destroyed or otherwise not legible). The results will reflect those substances that have documented NFPA 704 ratings matching the provided hazard inputs. Hazard data that has been left blank is ignored. Substances with unknown NFPA 704 ratings will be excluded.

Note that this feature is only intended for placards that represent a single substance. If a single placard is being used for an area where many chemicals are present, the placard will summarize the maximum ratings in each category, the combination of which may not match any of the individual substances or any of the substances in WISER.

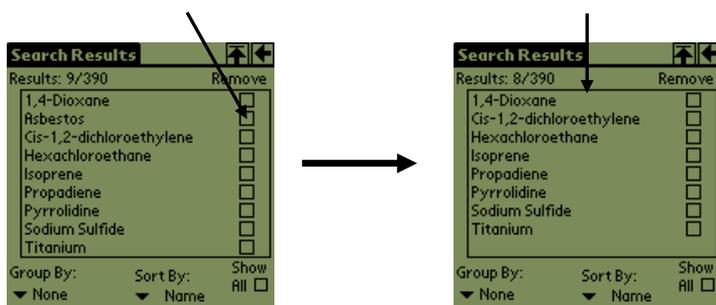
2.3.6. Search Results

To display a list of the substances that match ALL of the properties and symptoms that have been selected during a search for an unknown substance, tap the **Results** button located at the bottom of the [Identify Substance page](#) or any of the help identify criteria pages. Tapping a substance in this list displays the [Data page](#), the same as selecting a substance from the [Main page](#).



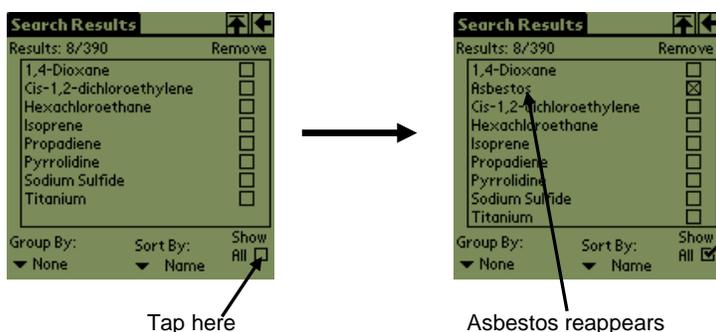
If a substance in the list is known to not be the unidentified substance, remove it from the results by tapping the checkbox following the substance name, as shown below.



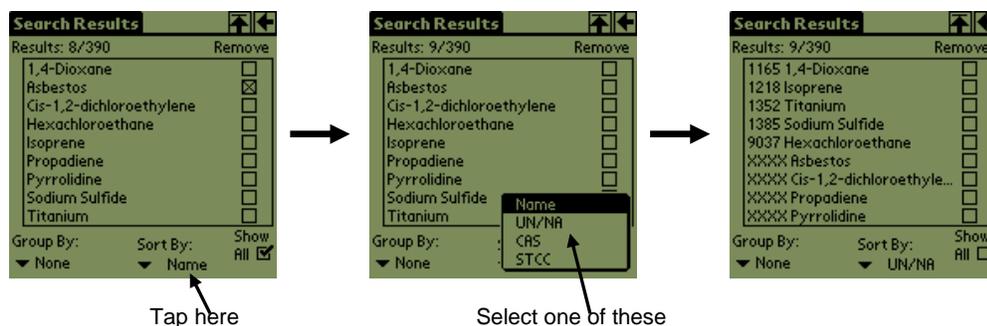


The size of the results list indicated above the list also decrements to indicate the removal.

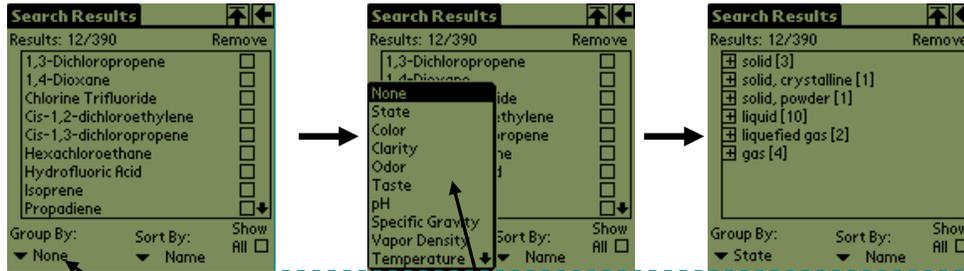
Any substances removed in this manner can be displayed again if the **Show All** checkbox is checked, as shown below.



The **Sort By** pull-down menu controls the ordering of the results list. By default, the list is sorted alphabetically by name. It can also be sorted by the following numbers: UN/NA, CAS registry, and STCC. When sorted by number, the substance names are prefixed with the chosen number type. If a substance does not have the selected number assigned, 'X' characters are used as placeholders. In the following example, the results list is ordered by UN/NA number, but two of the substances do not have such a number.



The **Group By** pull-down menu groups the substances in the list by one of the property or symptom categories. When a category from this menu is selected, the results list changes to a list of groupings by the properties or symptoms in the selected category. Each is followed by a number indicating how many substances are in the grouping. Grouping for properties or symptoms that do not contain any substances are not shown. The list of groupings may be augmented with an "Unknown" grouping. This contains the substances which do not have data for the corresponding symptom or property, and thus it is not known whether any of the symptoms or properties in the selected category apply.

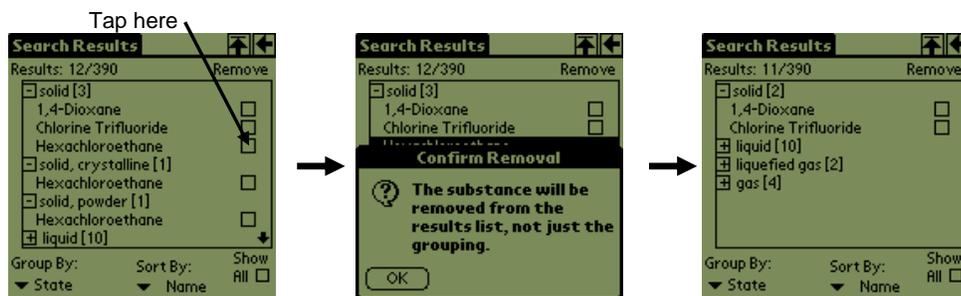


Comment [DML1]: This list was generated with the following search values: colorless, opaque, high body temp, dizziness, vomiting blood, dilated pupils

To view the substances within each grouping, expand the grouping by tapping the boxed “plus sign” to the left of the groupings. Tap again to contract.



When the results list is grouped, substances can still be removed (though the groups themselves cannot be removed). Note that when a substance is removed from a grouped display, that substance is removed from the results list, not just from that grouping. In other words, that substance will be removed from all groupings in which it occurs. To make this clear, removal of a substance from a grouped results list results in a confirmation dialog, as illustrated below. This dialog will not reappear for additional removals until WISER is restarted.



In the example illustrated above, note that, following the removal of Hexachloroethane, not only has it been removed from the “solid” grouping, but it has been removed from the “solid, crystalline” and “solid, powder” groupings as well. Since it was the only substance in those groups, the groups themselves are no longer visible.

2.4. Miscellaneous

2.4.1. Navigation

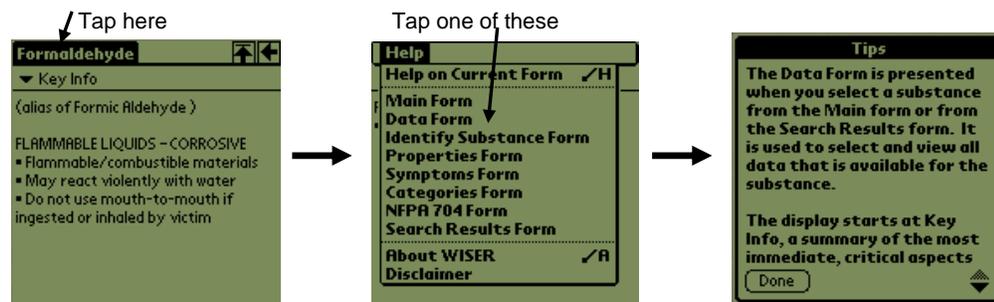
Except for the Main Page, each of the other WISER pages contain navigation arrows in the upper right corner. Tapping the “up-arrow” always returns you to the Main page. Tapping the “left-arrow” takes you back to the previous page you were viewing.

Tap here to return to Main Page Tap here to return to previous page



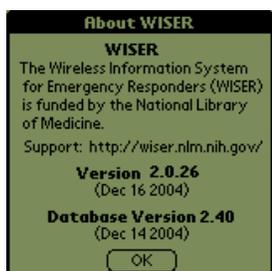
2.4.2. Help Menus

A help menu is available from the application menu bar, selected by tapping the page label on any page.



As shown above, the Help menu provides on-screen help for each of the displays in the WISER application.

The **About WISER** option in the help menu includes version information for both the WISER application and the database.



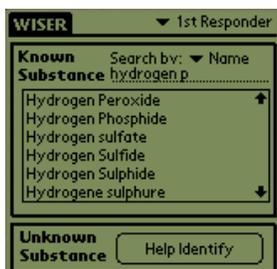
3. Tutorial

In this section, two scenarios are given as a tutorial for using WISER. In the first scenario, the substance is known; in the second, the substance is not known. WISER can be used in both of these scenarios to assist in responding to the incident.

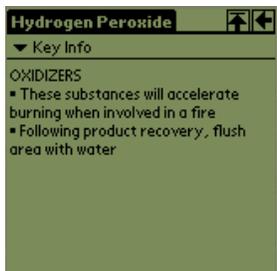
***Note:** *The tutorial section contains references to substance counts which may change as updated versions of the WISER database are released. This would be caused by the addition of new substances or updates to the search data. The counts reflected in these sections should be used for example purposes only.*

3.1. Known Substance

In this scenario, you are the first responder at a scene. There is an overturned cargo tank with 'Hydrogen Peroxide' on the side; the papers on board and the driver verify that it is hydrogen peroxide. There is a small fire caused by the engine on the cargo tank. The driver of the truck has been splashed with the hydrogen peroxide and may have ingested some of it.



The immediate tasks are to clear out an appropriate area around the tanker truck, treat the driver, and correctly respond to the small fire. Using the WISER application, you can use Graffiti (the native Palm alphabet) to write an 'h' in the text field. The list of substances will scroll down to substances beginning with 'h'. Continue entering letters until hydrogen peroxide is visible in the list (or use your device's scroll buttons to advance the rest of the way).

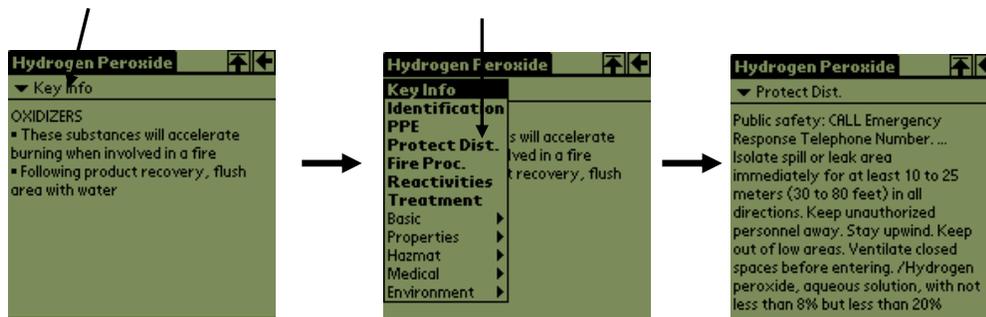


Tap on hydrogen peroxide. This will bring up the Data Page for hydrogen peroxide, showing the Key Info.

To determine the appropriate area around the spill that should be cleared out, tap on the Protective Distance option in the data menu, as shown below. This brings up the Public Safety and Evacuation distance information from the DOT Emergency Response Guidebook (ERG). (The ERG is also accessible in its entirety by tapping the Hazmat submenu.)

Tap here to bring up the data menu

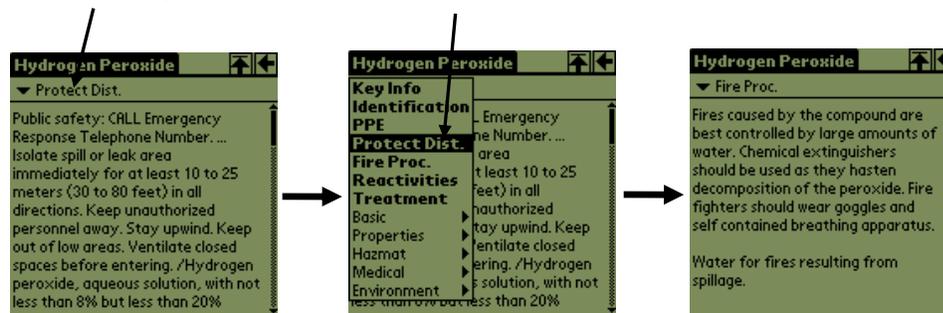
Tap here



For information on the correct response to the fire, tap on the Fire Procedures hot link in the data menu as shown below. (The fire procedures are also accessible from the Hazmat submenu.)

Tap here to bring up the data menu

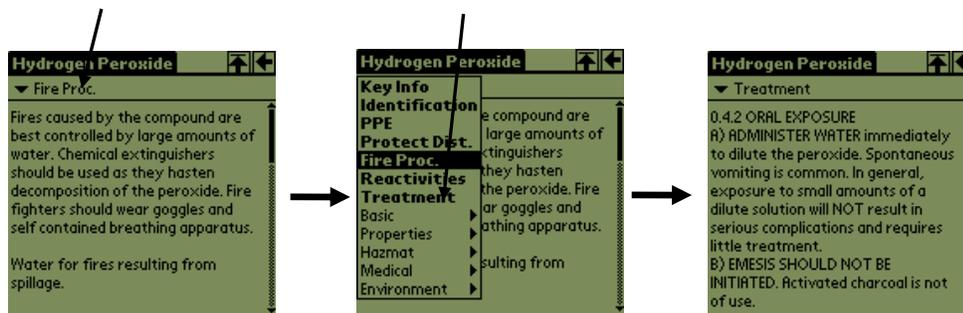
Tap here



Finally, treatment of the driver can be determined by tapping on the Treatment hot link, as shown below. (The treatment data is also accessible from the Medical submenu.)

Tap here to bring up the data menu

Tap here



If more in-depth information is required, such as physical properties, it can be found by selecting the category of interest in the data menu, and then the desired data element from the resulting submenu. For example, to view information about decomposition, you select the category 'Properties' from the data menu, and then 'Decomposition' from the resulting submenu.

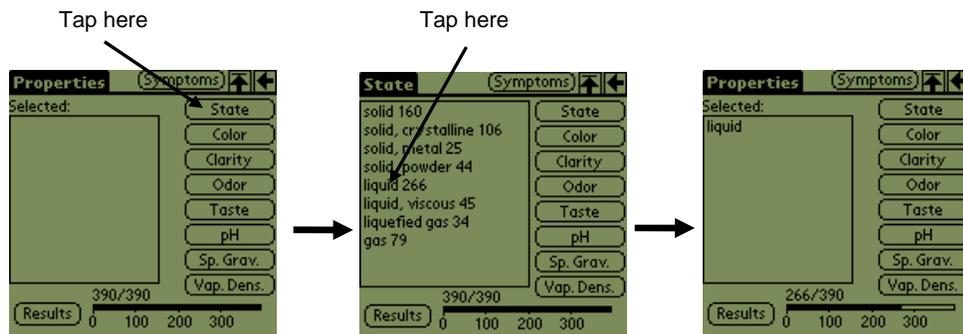
3.2. Unknown Chemical Substance

In this scenario, you are the Hazardous Materials Specialist responding to an incident at a warehouse. The warehouse has been cleared and the situation has been stabilized. Your primary task is to identify the substance and provide information and recommendations to the Incident Commander.

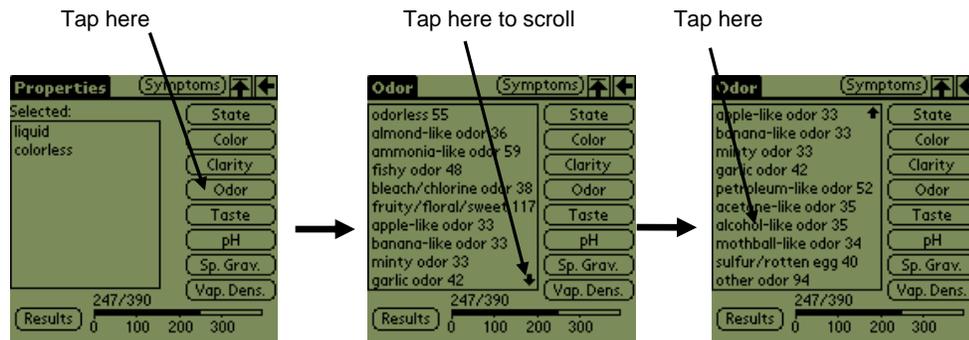
The substance in question has been leaking from an unmarked barrel. It has been described as a colorless liquid with an alcohol smell. The workers from the warehouse are showing the following symptoms: nausea, dizziness, headache, eye irritation, and low body temperature.

Using WISER in this situation, you tap on the **Help Identify** button on the Main page. If there is an existing search in progress, you should tap on **New Search** to save the search and clear out the symptoms and properties.

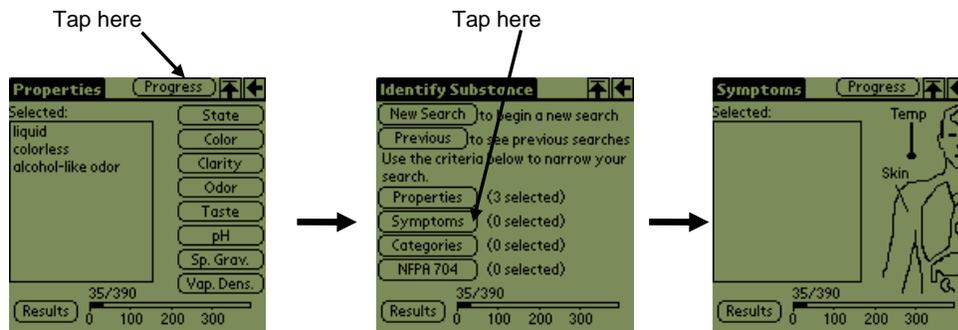
To enter the properties of the substance, first tap on 'State' to bring up the possible values of physical state and tap on 'liquid'. Liquid is now shown in the selected list and the number of matching substances has been reduced to 266 of the original 390.



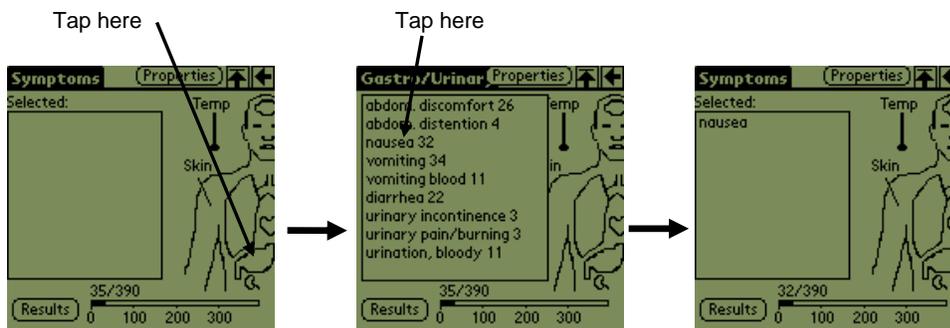
Then, following the same process, select colorless from the Color property and select 'alcohol-like' from the Odor property. For 'alcohol-like' odor, you might need to scroll to see that option in the list as shown below.



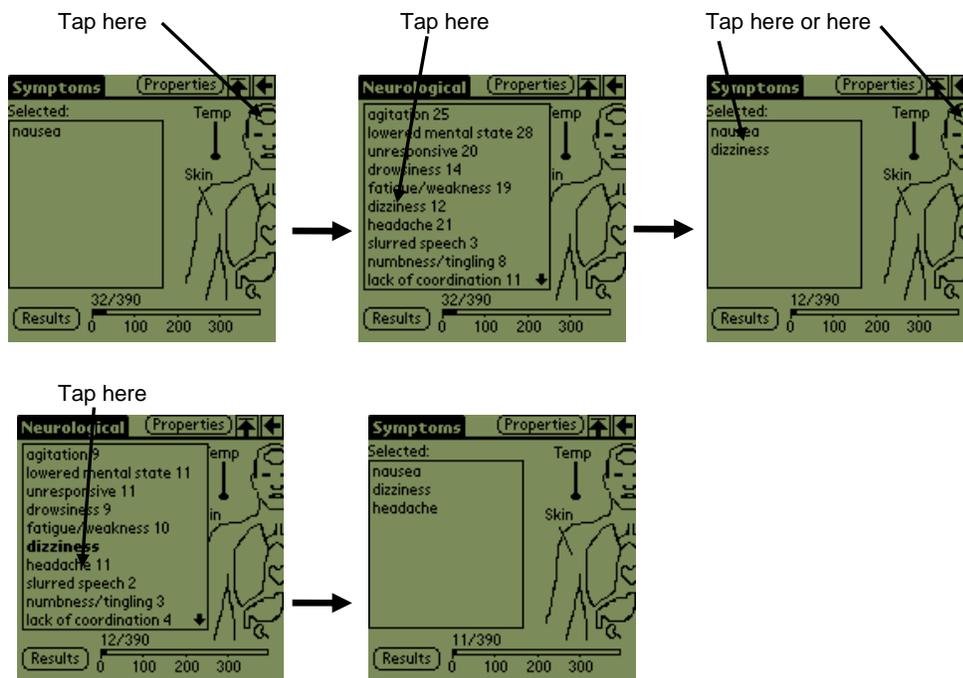
The result of using the properties liquid, colorless, and alcohol-like odor is that the original list of 390 substances has been reduced to 35. To enter victim symptoms, tap on the progress button at the top of the Properties page and then tap on the Symptoms button on the Identify Substance page.



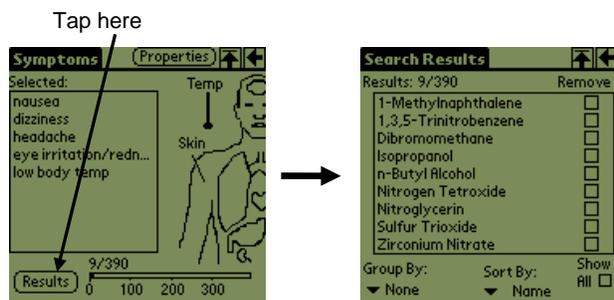
The symptoms of the exposed workers (nausea, dizziness, headache, eye irritation, and low body temperature) are selected by tapping on the body part that shows the symptom. For nausea, tap on the stomach and then tap on the nausea symptom from the list that pops up. Nausea will be added to the list of selections.



For dizziness and headache, tap on the brain. After dizziness has been selected, the neurological list can also be brought up by tapping on the dizziness symptom from the Selected list.



The symptoms of eye irritation and low body temperature are selected similarly. For eye irritation, tap on the eyes in the image of the human body. Then, tap on irritation. For low body temperature, tap on the image of the thermometer and then tap on low body temperature. The result of the symptoms, combined with the previously entered properties is shown below. To view the results of the search, tap on the Results button.

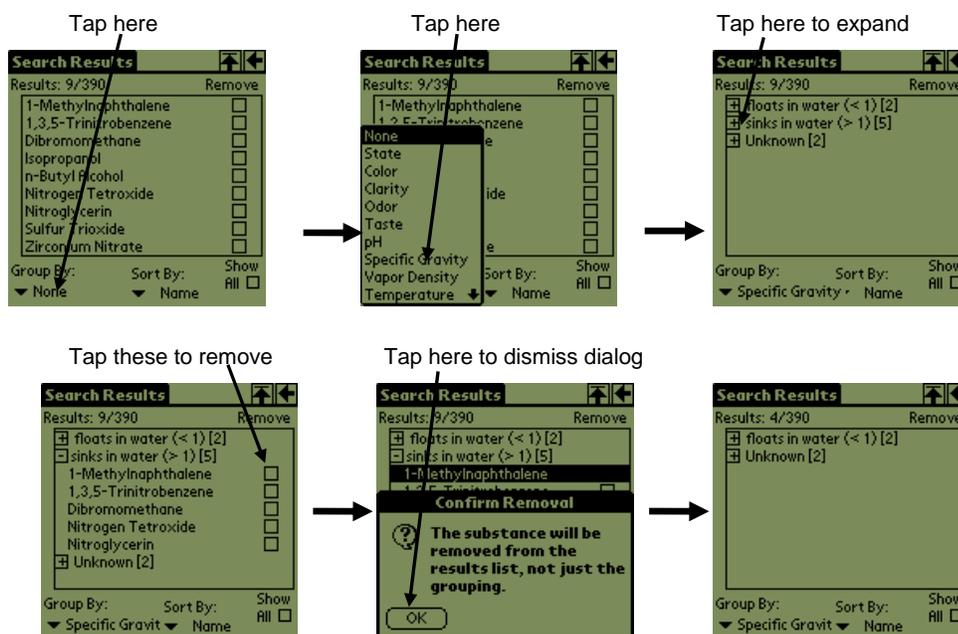


The search to this point has resulted in 9 substances that match the symptoms and properties selected. To determine the correct substance, the Results page allows the user to group and sort the substance in

different ways, remove substances that are known to be incorrect, and go to the Data pages for the substances.

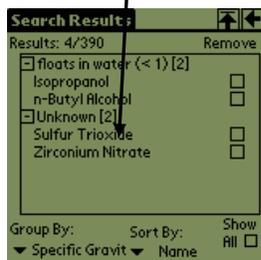
In this tutorial, the user groups by various symptoms and properties until getting to Specific Gravity; that information is used to narrow down the substances even more. Here, the user taps on the Group-by pull-down list, and selects Specific Gravity. Based on the results of the grouping, the user tests the substance and observes that the substance is not soluble and floats on water. Thus, the “sinks in water” substances are can be removed. As demonstrated below, this is done by tapping in the box to the left of the ‘sinks in water’ grouping and tapping in the remove boxes on the left. When all the substances have been removed from the grouping, the group will disappear.

The first time a substance is removed in this way, a dialog is presented to tell the user that the substance will be removed from the results list, not just from the grouping. So, if the substance is part of another grouping, it will be removed from there as well. Care should be taken in removing substances since a substance is often under multiple groupings, including a grouping that corresponds to the unknown substance. Removed substances can be viewed by checking the ‘Show All’ box on the bottom right; they can be inserted by unchecking the box next to the substance name.

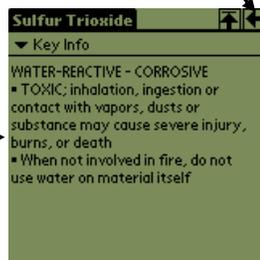


The remaining substances need to be examined in more detail to determine the correct substance. First, examine those under the “Unknown” grouping, which indicates that WISER does not have specific gravity data for them. Selecting Sulfur Trioxide to view the Data Page, the Key Info indicates that it is water-reactive. Further investigation indicates that the melting point is 16.8° C. So, at the current temperature, it should be a solid. It is thus likely that this substance can be removed.

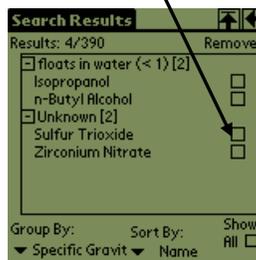
Tap here to view data



Tap here to return to Results



Tap here to remove

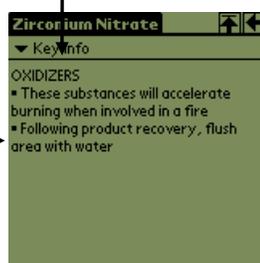


Next, examine Zirconium Nitrate. This substance is water-soluble and hence unlikely to be the correct substance. It is likewise removed.

Tap here to view data



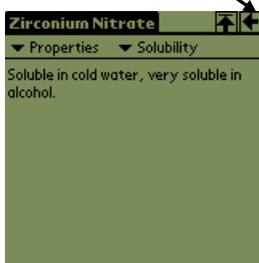
Tap here



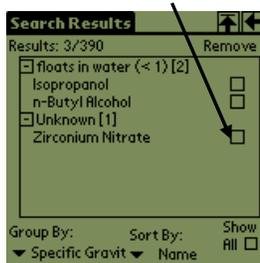
Tap here, then here



Tap here to return to results



Tap here to remove



As shown above, the final results of the search are Isopropanol and n-Butyl Alcohol. Further investigation of each, using the Data Page, shows that these two hydrocarbons have very similar characteristics and procedures. For example, the Emergency Response Guidelines for both are the same.



4. About NLM

The National Library of Medicine (NLM) is the world's largest medical library. The Specialized Information Services (SIS) Division of NLM is responsible for information coverage and services for several areas, including environmental health and toxicology, AIDS, and directories to other information resources concerned with health and biomedicine. SIS maintains the Hazardous Substance Data Bank (HSDB), covering over 4700 substances, their toxicology, emergency handling procedures, and environmental fate. The NLM is part of the National Institutes of Health, an agency of the U.S. Department of Health and Human Services.