

## Research Questions:

1. Why do they need the system?
2. Who will be using the system?
3. What is the current reporting process?
4. What are the current problems/concerns?
5. What incidents are reportable?
6. How do we encourage workers to report safety and health concerns?
7. What reports are needed?
8. What are similar reporting systems? What are their pros and cons?
9. What are the design guidelines/suggestions for office reporting system?
10. What are the design guidelines/heuristics for dashboard design?

## Secondary Research

### 1. Why do they need the system?

The U.S. Bureau of Labor Statistics (BLS) data have shown a continuous decline in occupational injury rates since the early 1990s while several studies have argued that the official statistics regarding occupational injuries are flawed because of systematic underreporting [8]. Today nursing homes and residential care facilities employ approximately 2.8 million workers at 21,000 work sites. Many nursing home tasks require a lot of lifting and other strenuous physical labor. Data have shown that injury rate for workers in these facilities is double the injury rate for all full time workers in other occupations[7].

However, not all injuries were reported. Weddle[9] found that 39 percent of hospital service workers had not reported one or more injuries despite the fact that 64 percent of these unreported injuries required medical care and 44 percent resulted in lost work time. **Hospital service workers were also found to be less likely to report if they were older and had longer tenure**[10].

According to OSHA, It's employees' rights to:[1]

- "Report an injury or illness, and get copies of your medical records"
- "See copies of the workplace injury and illness log"
- "Review records of work-related injuries and illnesses"
- "Get copies of test results done to find hazards in the workplace"

- “If an employee believes working conditions are unsafe or unhealthful, you may file a complaint with OSHA concerning a hazardous working condition at any time. If possible, bring the conditions to your employer's attention. If the condition clearly presents a risk of death or serious physical harm, there is not sufficient time for OSHA to inspect, and, where possible, a worker has brought the condition to the attention of the employer, the worker may have a legal right to refuse to work in a situation in which he or she would be exposed to the hazard.”

It's employers' rights to[1]:

- Provide a workplace free from serious recognized hazards and comply with standards, rules and regulations issued under the OSH Act.
- Examine workplace conditions to make sure they conform to applicable OSHA standards.

### Key Insights

- This system should provide an easy and accessible way for employees to report their occupational injuries. The terminologies and the way the questions are worded should be taken into consideration in order to accommodate to users in different age groups, with different educational levels and different language proficiency.
- This system should be able to help employers to identify the current issues in the workplace and address them in order to make sure the workplace conditions conform to applicable OSHA standards.

## 2. Who will be using the system?

All employees and employers in nursing homes.

- Certified Nurse Aides (CNA)  
Focusing on bed pad changes, dressing, etc
- Certified Medical Aides (CMA)  
Responsible for diagnosis, e.g. symptoms, etc.
- Licensed Vocational Nurses (LVN)
- Assistant Director of Nursing (ADON)
- Administrators

The first three types of users can only report incidents through a portal. Credentialed users which are ADON and administrators have access to the whole reporting system including the reporting section and management of all reports.

\* An employer can report an incident on behalf of an employer.

### 3. What is the current reporting process?

#### Traditional Forms:

Digital systems, Paper forms, and Verbal Reports

- To report an incident, an employee (or an administrator) completes an injury or illness report
- Submitting an incident report creates a case.
- The administrators review a report to decide whether it is OSHA reportable or not.
- If it is reportable, the administrator adds variables of other form types(E.g. Workers comp/OSHA 300/OSHA 301) to a case.
- If the injury requires medical attention or if the employee requests time off, then a worker compensation form must be completed by the ADON/Business Manager. (**QINYU: So the worker comp form does not have to be filled every time?**)
- OSHA 300/301 form is later submitted by an admin.

### 4. What are the current problems/concerns?

#### a. Privacy issue

Injury report forms involve private health information on related employees, and that privacy must be respected with confidentiality[3].

Employers are **prohibited from entering an employee's name on the OSHA 300 Log** in the following cases (considered "privacy cases")[3]:

- i. the injury or illness occurred to an intimate body part or the reproductive system;
- ii. sexual assaults;
- iii. mental illnesses;
- iv. HIV infection, hepatitis, or tuberculosis;
- v. and needlestick injuries and cuts from sharps where the objects are contaminated with another person's blood.

In these privacy concern cases, a separate confidential list of employee names must be kept. Employers also have the right to use discretion in describing the sensitive nature of the injury where the worker's identity would be known.

## Key Insights

- The system should provide users to choose whether it is a privacy cases when reporting an incident. (The definition of ‘privacy cases’ should be offered as a tip to help with the identification of such type of cases.)
- **In a privacy case, the name of the employee is prohibited to be entered. So what (additional) types of data should be collected for these types of cases?**

**b. A lot of people do not report injuries because of a belief that the incident was not serious enough to report**

One of the biggest obstacles in reporting injuries and filing claims is tied to employees’ perception of which incidents are eligible to be reported.[13]

*“It’s a job expectation... What did you expect...? It was going to be easy?” (Nurse)*

*“They are basically caregivers, and they continue to try to take care of others, and they put themselves last”. (Nurse) [13]*

**c. The form takes too long to fill out and they don’t have the time. When the ward is busy, they forget to make a report[13].**

Some of them are simply working under tight time constraints and feel they cannot “afford” to interrupt their tasks.

### Key Insights

- The system should provide auto generation of fields in order to simplify the process. And providing selections for an answer can help with simplification of incident reporting as well as standardize the input and can further improve statistics analysis of data collected.

**d. The reports are difficult to fill out, especially for those with limited education[13].**

For example, the process may be difficult for workers who have limited literacy or who are unfamiliar with human resources personnel.

### Key Insights

- The wording of questions for fields should be easy to understand. Visualizations like icons or graphics may help.

**e. Workers felt they were blamed for the injury and will receive punitive actions[13]:**

*“They [nursing supervisors] are up there before we know it helping us out. (Nurse)*

*The nurse manager ...verbally attacked nurses that wrote [reports] saying they were trying to cause trouble.” (Nurse)*

- f. Employees were also very concerned about the consequences that reporting injuries or pursuing workers’ compensation claims could have on their reputation[13].**
- g. For some cases, underreporting can occur as a result of reporters not able to identify a proper classification or definition[13].**

A reporting system must define what a reportable event is in order to standardize reporting , and explicit classification and definition used in domain field that are able to determine whether an event is recognized or ignored.

### Key Insights

- Hints of description of reportable types of incidents should be provided.

## 5. What incidents are reportable?[5][15]

- Any work-related fatality.
- Any work-related injury or illness that results in loss of consciousness, days away from work, restricted work, or transfer to another job.
- Any work-related injury or illness requiring medical treatment beyond first aid.
- Any work-related diagnosed case of cancer, chronic irreversible diseases, fractured or cracked bones or teeth, and punctured eardrums.
- There are also special recording criteria for work-related cases involving: needlesticks and sharps injuries; medical removal; hearing loss; and tuberculosis.

### Key Insights

- The definitions above need to be reworded in a more clear way to be presented in the system.
- Maybe we can provide a link to/integrate the FAQ section part of the OSHA website where a lot of similar questions were asked. This may help if the admin really cannot decide whether this is reportable or not. (<https://www.osha.gov/recordkeeping2014/faqs.html#reporting>)

For any fatality that occurs within 30 days of a work-related incident, employers must report the event within 8 hours of finding out about it.

For any **in-patient** hospitalization, amputation, or eye loss that occurs within 24 hours of a work-related incident, employers must report the event within 24 hours of learning about it.

### Key Insights

- The system should tell the users this type of incident should be reported within how long since the incident occurred.

Employers reporting a fatality, in-patient hospitalization, amputation or loss of an eye to OSHA must report the following information:

- Establishment name
- Location of the work-related incident
- Time of the work-related incident
- Type of reportable event (i.e., fatality, in-patient hospitalization, amputation or loss of an eye)
- Number of employees who suffered the event
- Names of the employees who suffered the event
- Contact person and his or her phone number
- Brief description of the work-related incident

Employers **DO NOT** have to report an event if it:

- Resulted from a motor vehicle accident on a public street or highway, except in a construction work zone; employers must report the event if it happened in a construction work zone.
- Occurred on a commercial or public transportation system (airplane, subway, bus, ferry, street car, light rail, train).
- Occurred more than 30 days after the work-related incident in the case of a fatality or more than 24 hours after the work-related incident in the case of an in-patient hospitalization, amputation, or loss of an eye.
- Employers do not have to report an in-patient hospitalization if it was for diagnostic testing or observation only. An in-patient hospitalization is defined as a formal admission to the in-patient service of a hospital or clinic for care or treatment.
- Employers do have to report an in-patient hospitalization due to a heart attack, if the heart attack resulted from a work-related incident.

- To be reportable, the in-patient hospitalization must occur within 24 hours of the work-related incident that injured or made the employee ill. Scheduled surgeries that occur beyond this 24 hour period are not reportable to OSHA.

### Key Insights

- The system should also tell users if the report is NOT reportable according to users' input.

## 6. How do we encourage workers to report safety and health concerns through design?[6]

- Include an option for anonymous reporting to reduce fear of reprisal. (QINYU: Can they report an incident anonymously?)
- Report back to workers routinely and frequently about action taken in response to their concerns and suggestions.
- To participate meaningfully in the program, workers must feel that their input is welcome, their voices will be heard, and they can access reporting mechanisms. Participation will be suppressed if language, education, or skill levels in the workplace are not considered, or if workers fear retaliation or discrimination for speaking up (for example, if investigations focus on blaming individuals rather than the underlying conditions that led to the incident or if reporting an incident or concern could jeopardize the award of incentive-based prizes, rewards, or bonuses).

### Key Insights

- The design should show the responses to users' reports and provide some positive/active feedback.

## 7. What reports are needed?

### a. Incident report, including the following data elements:

- i. Employee name
- ii. Manager name
- iii. Shift
- iv. Employee position
- v. Event date and time
- vi. Injury type

- vii. Injury description
- viii. Medical Symptoms
- ix. Medical Evaluation (Y/N)
- x. Medical Diagnosis (Dependent on evaluation)
- xi. [Timestamp for report submission - SYSTEM]

### **b. Worker compensation form**

It is designed to compensate workers for the economic losses they may incur because of medical expenses and earnings losses caused by an on-the-job injury or illness. It includes the following data fields:

- i. Employee name
- ii. Home address
- iii. Home phone
- iv. BOF
- v. SSN (Encrypted Input)
- vi. Gender
- vii. Hire date
- viii. Marital Status
- ix. Location
- x. Job Type
- xi. Incident Location
- xii. Work phone
- xiii. Manager's name
- xiv. Manager's phone
- xv. Date and time of incident
- xvi. Date and time for reporting the incident
- xvii. Witnesses
- xviii. Activities performed prior to incident
- xix. Incident Type
- xx. Incident Description
- xxi. Parts of the body affected (How to standardized the input, maybe through visualization?)

- xxii. Type of Injury
- xxiii. Injury Location
- xxiv. “Have you ever been treated for a similar injury?”
- xxv. “Are you requesting medical treatment at this time?”

**c. OSHA 301[3]**

This is the first form you fill out during the recording process. It must be completed and filed within seven calendar days after an accident has been identified or announced.

OSHA requires you to keep 301 forms on file for at least five years following the year the accident occurred. (QINYU: Do we need OSHA 300A - the Summary of Work-Related Injuries and Illnesses?)

**d. OSHA 300 - Log of Work-Related Injuries and Illnesses[3]**

Form 300 is a comprehensive, organized log of injuries and illnesses that occur on your work-site throughout the calendar year. Again, this form not only serves to comply with OSHA recording regulations, but also gives employers a compact, visual narrative of workplace accidents that may end up becoming a crucial element in finding patterns and implementing new or adjusted safety programs.

*\*Generate a case number, following numerical order as new injuries or illnesses occur throughout the year. It's best to use 2 or 3 digits (01 or 001)[3].*

## 8. What are design precedents?

**SafePersonnel**(<https://www.safepersonnel.com/programs/accident-tracking/>)

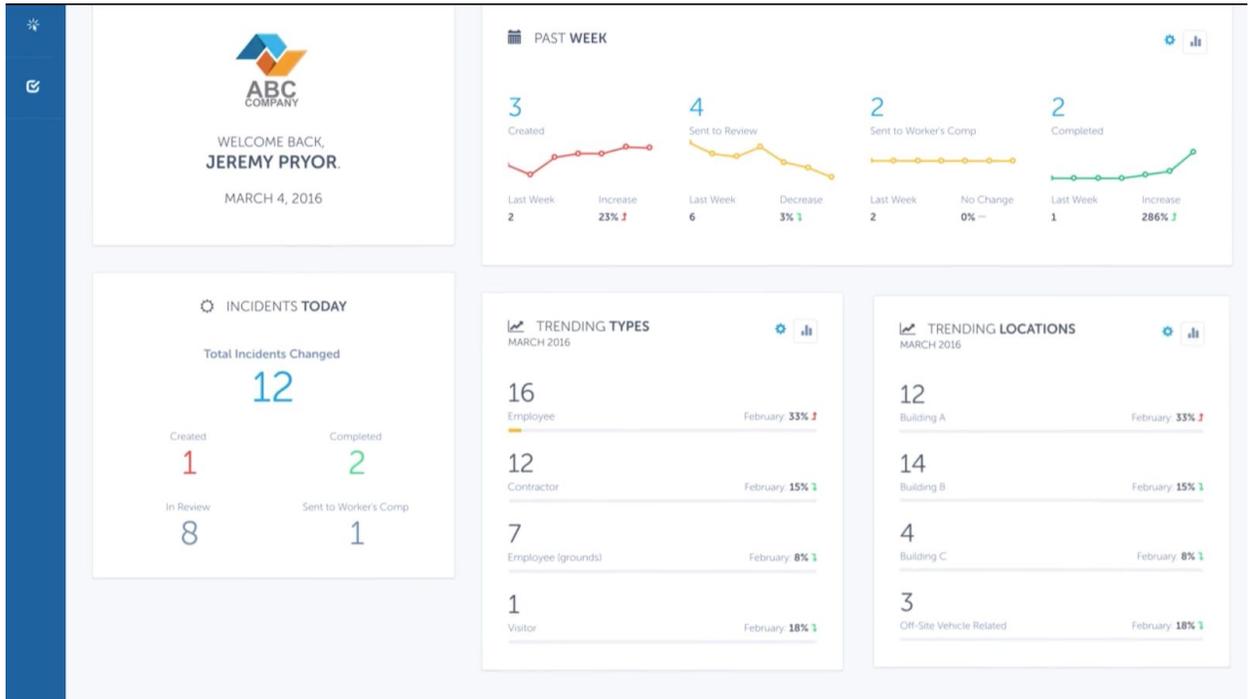
- Pros:
  - The dashboard is very clean and well organized.
    - Incidents Today
    - Incidents during past week (Increased/Decreased by xx%)
    - Trending Types
    - Trending Locations
  - It provides very organized filters when reviewing all reports.
  - It provides very good metadata for each report when reviewing all reports.
- Cons:

# Nursing Home Reporting System - Secondary Research

Qinyu Ding

Oct. 27th, 2019 | CIM 635 Human Centered Design

- Too much information is displaying in the dashboard



The 'Safe PERSONNEL' incident reporting form shows the following details:

- Incident Title:** Sandy slipped on wet floor in hallway B - possibly spraining her right wrist
- Incident Description:** Jim hurt himself climbing a ladder
- Form Progress:** DETAILED INFO Section 2 of 3, 45% Complete
- WHAT HAPPENED?**
  - Date of Incident:** 3.23.16
  - What was the employee doing prior to the incident?** The employee was in the building after COB to catch up on paperwork. She is a new employee and unaware that our janitorial staff begins to clean and mop at 7:00 pm every evening during the work week. On departure of the building, the employee didn't notice the wet floor sign upon entering the main hallway leading to the elevators. The employee slipped and fell on her back while also attempting to catch herself with her right hand, hurting her right wrist. She felt pain in her wrist on the way home and proceeded to ice the wrist until the next morning when she reported the incident to her supervisor.
- Employee Information:**
  - What is the employee's first name? Sandy
  - What is the employee's middle name? Marie
  - What is the employee's last name? Larson

# Nursing Home Reporting System - Secondary Research

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The screenshot shows a 'FILTER INCIDENTS' interface. At the top, there are buttons for '+ Add Filter Group' and 'Add Saved Filter (1)'. The right side shows '146 results' and 'ALL ANY' filters. Below this is a search bar with 'Name' and 'of reporter' dropdowns, and a 'contains' dropdown with an input field 'Enter Name...'. There are also date filters: 'Created' between '8/24/15' and '10/24/15'. A '+ New Filter' button is present. Below the filters, there are 'ALL ANY Yellow Line' buttons and a 'Create Saved Filter' button with '273 results'. The main area displays a list of incidents:

- Sandy slipped on the wet floor in Hallway B - possibly spraining her right wrist**  
Injured Person: Sandy Larson Type: Employee Location: Administration Office ID #: 662  
date of incident: 3.23.16 reported: 3.23.16 (NEW)
- Fell off of chair while attempting to hang banner**  
Injured Person: Mindy Jackson Type: Employee Location: Room 224 ID #: 662  
date of incident: 9.29.15 reported: 9.29.15 (DONE)
- Jeremy fell down lower level stairs**  
Injured Person: Jeremy Cox Type: Employee Location: Stairwell A ID #: 662  
date of incident: 1.16.16 reported: 1.16.16 (In Review)
- Tripped on rug in front entrance**  
Injured Person: Michael Peterson Type: Visitor Location: Front entrance ID #: 662  
date of incident: 1.16.15 reported: 1.16.15 (In Review)

## Convergence IMS

A bad example of dashboard design.

The screenshot shows a dashboard for 'Establishment 15 items'. It includes a header with 'Start Date 1/1/2018' and 'End Date 10/31/2018'. Below the header are several charts and metrics:

- Corrective Actions:** 29% Percent Complete, 0% High Priority % Complete, 5 Older Than 30 Days, 6 Overdue.
- Incident Overview:** 25 Total Incidents, 25 Open Incidents, 22 Total Recordables, 22 Open Recordables.
- Top Root Causes:** Conditions - Equipment/Materials (2), Personal Factors - Physical Condition (2), Conditions - Communication (1), Conditions - Coordination & Planning (1), Conditions - Employee Mental State (1).
- Incidents by Type:** Pie chart showing Injury (17), Motor Vehicle (6), Property Damage (4), Environmental (4), Safety Observation (1).
- Top Incident Categories:** Body Positioning (1).
- Top Reporting Establishments:** Camas (20), Tampa (3), San Diego (2).

## 9. What are the design guidelines/heuristics/suggestions for reporting system[14]?

- Check value validity of data fields that easily encountered typos
- Set up prompts in reminding incident details that are important but were often overlooked in previous reports
- The auto-complete simplifies physical and mental needs for entering the entire content and speeds up the overall human computer interaction thus leading to a more effective and efficient use of the system
- Auto-generate users profile information from their accounts.

### Key Insights

- Try to standardize data collected by using drop-down lists, multiple selections, etc.
- For sections that are really important but are also really easily ignored because it requires too much input, maybe try to provide why this part is important, or provide some hints of what should be described in the section.

## 10. What are the design guidelines for dashboard design[16]?

- a. A dashboard should be contained within one screen with all the displayed data visible at the same time, with no scrolling required.**

A user should be able to glance over the dashboard and get a full overview of the situation. If content is hidden the user might think that the hidden data is not important. It will also be harder to compare between the displayed data if the user needs to scroll between them. The dashboard should only contain the essential data that is needed for analysis.

- b. Display Essential Data**

Do not make the user do calculations themselves, the dashboard is meant to reduce the workload of processing the data and should make it faster to analyse the data. There should be no more than 5-9 object visible in the dashboard at a time to avoid cluttering and halting the effectiveness of the analysis.

The dashboard should provide easy access to more detailed data so the users can drill down into the details if needed.

### c. Data Needs Context

The displayed data also needs to be viewed in a context that needs to be supplied by using a combination of color, legends, text-based explanation or tooltips, etc.

### d. Data Layout

- **The most important data should be placed at the top of the dashboard, more specifically the top-left.** This is due to the way most cultures read, the eyes will usually drift to the top left corner automatically.
- **If some data needs to be compared, they should be placed close to each other.**
- **The top information is the most newsworthy, while the middle information is important details, and lastly the bottom contains more general information.**  
This guideline is generally important for design and is not exclusive to dashboards.

### e. Choose the display media that can best conveys the data to the user.

Pie charts can be hard for users to accurately compare the sizes. (Kwaipien, 2016)

- ### f. Display media design should be consistent in style across charts. The colors selected for dashboard should not only be good on screens, but also on paper as it might also be printed out for some purposes.
- ### g. Keep the dashboard clean and neat looking and attractive so that the dashboard can be actually used by users.
- ### h. The dashboard should indicate the time, so that the user knows when the data is from.

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