Dashboard and Report Development Guide

The Oregon Health Authority Acute and Communicable Disease Prevention (ACDP) program provides the following guide for both internal use and as a template for partners when using various visualization and analysis tools.

This document outlines recommended considerations for the following stages of dashboard and report projects:

- Planning – determine roles, purpose, and requirements
- Developing – data sources, formatting*, and quality assurance
- Sharing – demonstrations for partners, public communications

*Formatting includes designing for the needs of people with disabilities, a state and local government web content requirement per Title II of the Americans with Disabilities Act (ADA) as of April 24, 2026. The ODHS|OHA policy on Digital Accessibility in Content Creation and Sharing sets a higher standard of Web Content Accessibility Guidelines (WCAG) 2.2 Levels A and AA, and states that "public facing content should be formatted as accessible web pages, HTML preferred."

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Planning

☐ **New** dashboard, report ☐ **Revised** dashboard, report

Roles

1. Define **roles** for development.
   - Decide who can make the final decision if consensus can't be reached.
   - Consider partnering with another organization if the message is better delivered from another source.

Role	**Name(s)** A person may serve in multiple roles
Requestor Who asked for the dashboard, report?	
Data steward Who knows these data, can advise on the data biography?	
Lead developer Who will build the dashboard, report?	
Technical consultant(s) Does anyone need to advise on methodology?	

Purpose

2. Determine the **purpose** of the dashboard, report.

Focus question	**Answer**
Are there any dashboards, reports already available on this topic? If yes, why is this one needed?	[e.g., recreating something that is jurisdiction-specific]
What is the value added?	
Who is the intended audience?	
What questions are we answering?	
Is there anyone who may be harmed?	
In what format will the dashboard, report primarily be used?	[e.g., Desktop, mobile, social media, printed]

Requirements

3. **Consider** the following as you discuss:
   - With what frequency will the data be updated, reported?
     - Weekly (for example, MMWR weeks Sunday–Saturday) or longer is recommended for reporting consistency and sustainability.
     - A service account or equivalent may be needed for automated updates and secure connections to the data sources.

   - What **types of charts** and interactions best fit the questions being asked?
     - Looking for guidance? See Stephanie Evergreen's Quantitative Chart Chooser and Qualitative Chart Chooser, or the Financial Times' Visual Vocabulary.
     - Can the charts be presented in way that is navigable by keyboard and screen reader users?

4. List and **prioritize** the requirements.

   Must-haves:

   -
   -
   -

   Nice-to-haves:

   -
   -
   -

5. List known, potential data **sources**; select one or more.
   -
   -
   -

6. Discuss **data governance** and structure:

Focus question	Answer
What restrictions do the data have (e.g., access, limitations)?	
What level of aggregation or suppression is needed?	
How will missing data be handled? Is a data scaffold required to display zeroes?	

7. Discuss **data equity** considerations:

Focus question	Answer
Who is made invisible, erased, or prioritized?[1]	
How will the data be standardized due to disparity?	[e.g., rates per 100K, age-adjustment]
How will health inequities be identified and displayed?	[e.g., compared to target value, statewide metric, or proportion of population]

8. What **permissions** do users of the dashboard, report need? Users will be:

✓	Jurisdiction	Access	Description	Server, data level
	Internal	Full	Authorized users, all have access to restricted line-level data.	Internal server only; up to Level 3 “Restricted” data.
	Internal	Restricted	Authorized users with differential access.	Internal server only; up to Level 3 “Restricted” data.
	External	Unlisted	The dashboard, report is available without logging in with user credentials, but the audience is narrow. The link is shared with external partners but not shared broadly.	External or public server; Level 1 “Published” data only.
	Public	Full	Publicly shared, with downloadable data	External or public server; Level 1 “Published” data only.

[1] Aghassibake N. Building Inclusive Data Visualizations. Hot Topics in Practice. 2021 Dec.

If “Internal, Restricted” was selected above, describe the different permissions required for each user type:

User type	Permissions
Viewer	
Publisher/Contributor	
Project Lead/Member	

9. **Sketch** a wireframe for the dashboard, report.
   Looking for dashboard layout inspiration? Try one of the following:
   - Dashboard templates in Stephanie Evergreen’s Data Visualization sketchbook
   - Browse example dashboards:
     - The Big Book of Dashboards
     - Tableau Public’s Viz Gallery
     - Power BI Data Stories Gallery
     - R flexdashboard layouts and example projects

[Insert or attach picture]

10. Agree on the **project plan:**

Focus question	Answer
How will the source data be accessed or delivered?	
How will the data be prepared, and by whom?	
Who will write up the data limitations?	
Who will write the narrative portions?	
What is the estimated development timeline?	
How often does the development team need to meet or provide progress updates?	
How will the development team approach changes to requirements, design, or timeline?	
Who is responsible for updating and maintaining the dashboard, report? Does it differ for: • Data vs. display? • Routine updates vs. feature requests?	
How will the dashboard, report be evaluated?	[e.g., embedded user feedback survey, key informant interviews]
Who needs to approve the dashboard, report and associated communications?	
Who needs a preview of the final product before publication?	

11. Share this **proposal** with your manager for approval to develop. Manager:

✓	Focus question
	Is additional clearance or approval required to release new data elements?
	Have you briefed senior leadership, if needed?

Development

Data source creation and security

Always consider data security for restricted, external and public dashboards, reports by doing the following:

- Create the **aggregate data source** first (e.g., with Excel, R, SAS, Tableau Prep Builder, Power BI – Power Query Editor, SQL) before connecting your reporting tool.
    - All suppression and aggregation needed for confidentiality must be done before you connect a dashboard, report that will be shared with people not authorized to view the underlying data.
- **Do not connect to restricted line-level data** unless conducting exploratory data analyses to inform the cleaning, aggregation, and suppression needed to share.
- Aggregate or suppress data from populations of fewer than 50 people. Consider binning counts of between one and five people.

Formatting

- Incorporate consistent **formatting** that aligns with agency standards:
    - Use agency colors and logo wordmark in accordance with the style guide.
    - Align with agency writing standards, including:
        - Use 12-point text or greater.
        - Don’t use italics.
        - Only use underlining for hyperlinks, not for emphasis.
        - Use an en dash (no spaces) in date and page ranges (e.g., 2021–2024)
        - Use an em dash (space on each side) to replace the phrase “that is” or parentheses (e.g., reportable conditions — defined by OAR).
        - Use “percent” when the number is given and “percentage” when it is not.
        - Use equity centered language, including person-first language when appropriate and refer to communities with their preferred terms.

- Apply data visualization best practices:
    - **Order** information from top to bottom, left to right.
    - Text is **horizontal** (e.g., titles, subtitles, annotations, data labels). Consider switching graph orientation to make text horizontal.
    - Focus attention by **removing unnecessary ink**. Remove borders from charts. Use labels sparingly. Gridlines, if present, are muted. Axes do not have unnecessary tick marks or axis lines. Boost the data-to-ink ratio (shout out to Edward Tufte)!
    - Use an appropriate **level of precision**: one decimal place, when necessary. If no decimal is necessary, use integers.
    - **Avoid dual axes**; instead, present the two data series in charts side-by-side or change the metric to show relative change over time.
    - Include a **date stamp** with the date data were updated and the dashboard update cadence.
    - List **contact** and **data source** information.
    - Include an **access statement** to “ensure that people with different communication needs receive effective communication”

Quality Assurance

Perform **quality assurance** checks of:

- Data aggregation and visualization to ensure the logic is correct and data are consistent.
- Interactivity function (e.g., navigation, filters, actions, downloadable data).
- Display on different devices. Build in time to test by publishing to hidden links, correcting things that don't display as expected.
- Dashboard performance on multiple browsers (e.g., Google Chrome, Mozilla Firefox, Edge, Safari) and devices (e.g., desktop, mobile, different browser magnifications).
- Dashboard **accessibility**, following Web Content Accessibility Guidelines (WCAG) 2.2 AA success criteria; a checklist is below, check all that apply.

Accessible text

✓	Accessibility Requirement	WCAG
	Web page has a descriptive **URL** and **title**.	2.4.2, 2.4.4
	Alt text is provided for images (e.g., agency logo).	1.1.1
	Web page has descriptive **headings**.	2.4.6
	Data visualizations have descriptive **titles** and/or captions with key takeaways.	1.1.1
	Narrative sections use text, not **images of text** (unless it's a logo).	1.4.5
	The main **language** on a page, and any words in a different language, are identified (if using markup).	3.1.1, 3.1.2
	Links are descriptive; the purpose of links (e.g., to references, other resources) can be determined from the link text alone.	2.4.4
	Tooltips are turned off or non-essential if tooltips are not accessible by keyboard, assistive technology.	1.1.1, 1.4.13
	Interactivity controls (e.g., navigation buttons, filters, parameters) have instructions, descriptive labels and error messages (if applicable).	1.1.1, 2.5.3, 3.2.2, 3.3.1 3.3.2
	Instructions for understanding and operating content don't rely solely on shape, color, size or direction.	1.3.3
	Web page has undergone a **plain language** review; ensure revisions do not change content meaning or intent.	3.1.5
Opt.	**Definitions** of unusual words, abbreviations provided (recommended, not required).	3.1.3, 3.1.4
	A **transcript** and **captions** are provided for embedded YouTube videos.	1.2.1, 1.2.2
	If an embedded video has narrative during a demonstration that precludes an audio description, an **alternative format** is available.	1.2.3

Accessible color

✓	Accessibility Requirement	WCAG
	Color is paired with direct labeling, shading, or shape.	1.4.1
	The **text** to background contrast ratio is at least 4.5:1 or 3:1 if large (18pt or bolded 14pt).	1.4.3
	Non-text (i.e., user interface components and graphical object like data visualizations) to background contrast ratio is at least 3:1. Lines in a chart have at least 3:1 contrast ratio with the background (not with the axes or with each other). Charts with adjoining colors (like a map) have 3:1 contrast ratio with each other or with the border boundaries.	1.4.11

Accessible function

✓	Accessibility Requirement	WCAG
	Connect to publishable aggregate data only, allow **downloadable data**.	1.1.1
	Filter or aggregate to reduce the **number of marks**.	Tableau
	Elements repeated across dashboards (e.g., navigation, icons, help) are **consistent.**	3.2.3, 3.2.4, 3.2.6
	Provide **multiple ways** for people to navigate (e.g., links from and to a home page that serves as a site map; links on each page to move forward or backward)	2.4.5
	If possible, provide a way to **bypass** repeated content.	2.4.1
	Design such that the default **focus order** (e.g., top to bottom, left to right) is a meaningful content order.	1.3.2 2.4.3
	Markup identifies **page elements**, to the extent possible (e.g., h1–h6 to identify headings)	1.3.1
	Pointer targets are at least 24 x 24 pixels or have sufficient spacing.	2.5.8
	Design such that all pointer actions have a **keyboard equivalent**.	2.1.1
	For any action that involves **dragging**, provide a simple pointer alternative.	2.5.7
	Provide user **instructions** for keyboard navigation (e.g., how to navigate away from components).	2.1.2
	Content can be **scaled to 400%** without loss of information or functionality. This may require development of a separate layout to present content in a single column (e.g., mobile).	1.4.4, 1.4.10
	Content can be viewed in both **portrait and landscape**.	1.3.4

Feedback and demonstration

Storytelling with Data: Feedback you hate to receive, provides guidance on how to solicit input:

- "Be thoughtful about **when** in your process you ask for input.
    - Lower fidelity iterations, for example a sketch of a graph or a sticky note outline can be useful to get broad directional input. With something rough, you can make it clear that the finer design details haven't been set or aren't relevant at this point.
    - If you show something that looks polished, it begs for those design details to be critiqued. On the flip side of this, if you really want input and something looks final, some people might shy away from giving candid feedback if it seems like it's too late in the process to do so."

- "A few ideas to get you thinking about how you might ask for **targeted** feedback:
    - Does the type of graph I've chosen make sense given the data I'm showing?
    - What questions do you have after reviewing that I should work to answer directly?
    - Is the point clear? How would you articulate the primary takeaway?
    - How do you feel about the general layout? What did you pay attention to first? What about after that?
    - Is there anything that strikes you as overly or unnecessarily complicated?
    - I only have a set amount of time (30 minutes, or by the end of the day) to make changes—do you see any issues that absolutely have to be addressed?"

Provide a preview **demonstration** to solicit feedback:

✓	**Audience**
	Peer developers
	Requestor
	Manager
	Communications partners
	Partners (identified in the project plan)

Large changes to the initial request will delay publication.

Approval

Email a summary, including the proposed launch date, for final **approval** from:

✓	Approver
	Requestor
	Partners (identified in the project plan)
	Manager
	Agency leadership (if applicable)

Documentation

1. Write a description of the dashboard **design** and guidance for routine **updates**.

   The following key documentation elements are adapted from the 'Dashboard Documentation: The How, Why and What' presentation at Tableau Conference 2024 and Oregon Health Authority Health Policy and Analytics' Infrastructure for Data Engagement and Access (IDEA) team guidance:

   - Summary Details –
     - Dashboard, report name
     - Purpose
     - Owner/developer
     - Backup publisher
     - Publication frequency
     - Version number – ID used to track changes or enhancements
     - Storage location of key files – the code to produce the final dataset and the means of creating the dashboard, report (e.g., Tableau workbook, Power BI report, Quarto)
   - Access –
     - Permissions required to maintain
     - Permissions granted to users
   - Data Sources – Information on the data sources used
     - Data source name
     - Data source description
       Including how to pull data from the original source (e.g., database, queries), data transformations applied, (e.g., joins, variables created, suppression required).
     - Data range – e.g., timeframe of data
     - Refresh frequency
     - Predefined filters – not available to the user (e.g., initial exclusion of data)
   - Formatting (if not determined by style guide, template, preferences file, or CSS)

    - Dashboard size
    - Logo size
    - Colors, how they're used
    - Text font, size, color by type (e.g., title, subheading, navigation, body)
    - Date format
- Dashboard, report descriptions – may include screen shots
    - How each visualization is constructed
    - Alternative text for each element, if manually written.
    - Tooltips, if provided.
- Tables and Fields
    - Field Name
    - Dimension/Measure
    - Data Type
    - Table Name
- Calculated fields – Created within the reporting tool. Use **caution** when splitting logic between the data source layer and the report layer; the additional complexity can make troubleshooting more challenging.
    - Field Name
    - Dimension/Measure
    - Data Type
    - Formula
    - Data Source Name
- Parameters – Parameters used in the dashboard, report
    - Parameter name
    - Data type
    - Default value
    - Values
- Available filters – Filters available for use (global, page specific)
- Publication
    - Server or website host
    - Step-by-step process guidance (for new developers)

2. Arrange for back-up!
    - Ensure a colleague has the required access.
    - Offer a walk through for cross-training.

Launch

1. Develop a **communications plan** which could include:
    - Translation into priority languages,
    - Identification of a spokesperson for media requests,
    - A newsletter feature,
    - A press release,
    - Content for sharing on social media, and
    - Website updates.

2. Provide a **preview** of the dashboard, report (and talking points, if needed) to partners identified in the project plan.

3. Publish the **summary table** with downloadable data first, if separate. Update the summary table **URL** link from the main dashboard, report. **Publish** the main dashboard, report.

4. Update any **references** on related websites.

Version History

Version	Date	Notes
v2.0	Apr. 2025	Adapted to the Acute and Communicable Disease Prevention Informatics Program. • Presented as a separate document. • Generalized to apply to dashboards and reports built using a variety of tools and from other jurisdictions. • Expanded focus questions, considerations, and linked resources. • Added a section on user permissions. • Updated to reflect WCAG 2.2 AA Success Criteria. • Expanded sections on feedback and documentation.
v1.0	Dec. 2022	Included in the COVID-19 Response & Recovery Unit Data Analysis & Reporting Team Tableau Development Guide

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