ADVANCING THE CONTINUED DEVELOPMENT AND SUSTAINABILITY OF NATIONAL PUBLIC HEALTH DATA DASHBOARDS VIA MAPPING AND ANALYSIS OF THE ECOSYSTEM

PUBLIC HEALTH DATA DASHBOARD LITERATURE REVIEW DATA ABSTRACTION INSTRUMENT

Research Questions:

- What is the current landscape of national public health data dashboards? Who creates them, for what purpose, with what data, and for whom?
- What processes and/or frameworks are used for the development, implementation, and evaluation of national public health data dashboards? What are common metrics/indicators for assessing use and impact?
- What design approaches, principles, and features are most frequently incorporated in national public health data dashboards? How may they be associated with the use of these tools?

Information/Variable	**Assigned Values/Codes**	**Specific Instructions**
CASE STUDY IDENTIFIERS		
Publication full citation information (APA style)	Author(s), year, title, publication, volume/issue, pages, DOI.	Please also include a copy of the abstract. Remember to check for supplementary materials as some of the relevant information may be included in these.
Keywords/tags		If applicable, copy and paste the keywords or tags attached to the publication. Use a semicolon (;) to separate each keyword.
Case study type	1. Descriptive 2. Cumulative 3. Exploratory 4. Explanatory 5. Other____	A ***descriptive case study*** describes the development and/or features of a specific data dashboard. A ***cumulative case study*** describes and/or compares lessons learned from developing/implementing the same or a similar data dashboard across settings (e.g., multiple states or groups of users). An ***exploratory case study*** involves testing and refinement of a data dashboard, e.g., by soliciting user feedback (including use of website analytics) or experimenting with different features. This category includes evaluation. An ***explanatory case study*** is focused on qualitative and/or quantitative evaluation of impact, i.e., evidence of associations between use of the dashboard and users' knowledge, decisions, or actions.
Information provided about the case study	1. Dashboard development/design process 2. Sources of data used	Select all that apply

	3. Dashboard features and/or functionalities 4. Results of usability tests (including user feedback) 5. Dashboard deployment or dissemination procedure 6. Dashboard use/usability evaluation (e.g., tracking use) 7. Dashboard impact evaluation (i.e., effect on users' decisions or actions) 8. Other _____	
Research methodology	1. N/A 2. Quantitative 3. Qualitative 4. Mixed-method 5. Other_____	This variable applies only to case studies involving research for the purpose of developing, implementing, or assessing effects of a data dashboard on users. It does not involve cases in which a dashboard is used to produce estimates or comparisons of certain health indicators.
AUTHOR IDENTIFIERS		
Corresponding author's email address		Typically shown at the beginning of the paper or in a footnote. This information is needed to identify potential recruits for the survey of public health data dashboard creators.
DASHBORD IDENTIFIERS		
Dashboard name		Record full name and acronym, if applicable.
Dashboard URL		Record the dashboard URL as reported in the paper. If one is not provided, try to search for it by name using a Google search.
Dashboard still active?	1. Yes 2. No (broken link) 3. Unsure (can't find it)	Check if the URL provided for the dashboard in the article link still works or is a broken link.
Dashboard accessibility	1. Open access 2. Conditional access 3. Unsure (no link is provided, or the dashboard is not yet published / in development phase)	Based on the information provided in the paper or inspecting the URL's website, determine whether users can access the dashboard without conditions or restrictions (***open access***), if they satisfy a specific condition such as registering as a user first (***conditional access***). Remember that dashboards with restricted access (that is, can only be accessed by a particular user group) are excluded from this study.
Dashboard host	1. Federal government site (e.g., CDC, NIH, AHRQ) 2. State government site	To determine the host, look for information provided in the article (be mindful that the creator of the dashboard is often, but not always, also the host), or look at the URL for a domain name (e.g.,

	3. Local (e.g., city) government site 4. University site 5. Non-profit /philanthropy site (e.g., Pew, Urban Institute) 6. Media organization (e.g., NYT) 7. Industry (e.g., a pharmaceutical company such as Johnson & Johnson or an HMO such as Aetna) 8. Independent host 9. Other ___	.gov is a government website, .edu is a university website, .org is a non-profit website, etc.).
Dashboard funder	1. None referenced / unclear 2. Independent / self-funded 3. U.S. government (e.g., CDC, NIH, AHRQ, etc.) 4. State government (i.e., a state agency or a department) 5. City government 6. Academic organization 7. Philanthropic organization (e.g., RWJF, RAND, another foundation) 8. Non-profit organization (e.g., American Cancer Society) 9. Business/industry (e.g., a pharmaceutical company, an HMO, or a news organization) 10. Other ___	Select all that apply. Hint: Look at Acknowledgements or Funding Source section for information about a funding source.
Funding mechanism	1. None referenced 2. Grant/award 3. Contract 4. Self or internally funded 5. Other ___ 6. Unsure (not clear what the mechanism of funding is)	Select all that apply Hint: Look at Acknowledgements or Funding Source section for information about a funding mechanism.
Dashboard software		Software used to create dashboard (list all that are mentioned; separate multiple entries by semicolon)
DASHBOARD DATA SOURCES AND CONTENT		
Data source(s)	1. Federal agencies (e.g., CDC, AHRQ) 2. State agencies (e.g., state department of health)	Select all that apply

	3. Local agencies (e.g., municipal, local health departments) 4. Research organizations (e.g., university research, RTI) 5. Health care facilities administrative data (e.g., ER records, hospitalizations) 6. Patient/clinical data (e.g., symptoms, illnesses) 7. Insurance claims data (e.g., Medicaid or an HMO) 8. Polling organizations (e.g., Gallup, Roper) 9. Industry (e.g., consumption data) 10. Media (news, social media) 11. Dashboard users 12. Other ____	
Type of public health data	1. Epidemiological data (e.g., incidence of disease, illness, events such as drug overdoses) 2. Clinical data (data related to patient diagnosis, exposures, laboratory tests, etc.) 3. Health services data (data about services provided by certified health providers such as hospitalization, ambulatory care, screens, medications, and immunization) 4. Behavioral data (self-reported measures of beliefs, attitudes, and behaviors, including consumption) 5. Health outcomes data (e.g., births, deaths, life expectancy, quality of life) 6. Media data (for example, news coverage, social media posting) 7. Other ___	Select all that apply
Public health issue		Open ended – record the public health issue(s) addressed by the dashboard according to the authors; use semicolon to separate multiple issues. If possible, try to use broad terms to capture ***major diseases*** (e.g., cancer, cardiovascular disease, HIV/AIDS, STDs, Alzheimer's disease,

		COVID, and mental disorder); ***chronic conditions*** (diabetes, asthma, hypertension, etc.); ***major health risks*** (e.g., tobacco use, drug/alcohol use, obesity, distracted driving, suicidal ideation, exposure to harmful chemicals etc.); or ***major determinants of health disparities*** (e.g., access and/or utilization of services, literacy or knowledge gaps, insurance coverage, etc.).
Purpose of presenting data	1. Epidemiological surveillance (incidence of illness, risk factors, etc.) 2. Behavioral surveillance (tracking attitudes and behaviors) 3. Policy surveillance (tracking legislation or policies) 4. Information surveillance (tracking information from a single or multiple information sources: news, social media, providers, etc.) 5. Tracking/comparing access to services (e.g., availability of facilities or services in a community) 6. Tracking/comparing utilization of services (e.g., proportion of population screened or immunized) 7. Tracking/comparing health outcomes (e.g., births, deaths, life expectancy, quality of life measures) 8. Exploration or analysis of sources or causes of health disparities (social determinants of health) 9. Prediction of future trends or outcomes 10. Proposing data-based prescriptions for action (e.g., offer free mammograms for low-income women) 11. Other ___	Select all that apply. This variable is designed to capture the way the data presented are intended (or may be potentially used) to educate users and/or inform their decisions and actions (data actionability), by tracking and monitoring key indicators, exploring associations between variables, or generating predictions of future trends or outcomes. Coding of this variable may be based on the authors' own account of purpose or based on inferring purpose from the type of data included in the dashboard and/or examples of how the dashboard may be used.
Populations represented in the data	1. General population 2. Provider population 3. Patient population	Select all that apply. This variable only applies to human populations; not to other types of populations such as services, clinics, and news stories.

	4. Specific or specialized sub-population (e.g., women, adolescents, Latinos, etc. – please include a description)_____ 5. Other ___	General population applies to cases when all groups or segments of a population are represented (e.g., data obtained from national or state-representative samples).
Level / granularity of public health data	1. Local (city, town, county) 2. State 3. National 4. International	Select all that apply
Data disaggregation options	1. Demographics (age, gender, race, ethnicity, etc.) 2. Spatial (geographical) 3. Socioeconomic factors (education, income, etc.) 4. Environmental factors (e.g., neighborhood characteristics) 5. Temporal (year, month, etc.) 6. Other ___	Select all that apply
Data integration options	1. Yes 2. No	An option for integrating health data with social determinants of health data for the same group or locality (e.g., rural health indicators by rural access to broadband internet).
Conflict of interest declared	1. No 2. Yes (please record the conflict noted) ___	Examples of relevant types of conflict of interest include profiting directly or indirectly from use of the data dashboard, biased or selective representation of findings/conclusions, and limited freedom or independence regarding the choice of questions and methodologies (e.g., because of constraints posed by the funder).
DASHBOARD DESIGN AND USER EXPERIENCE		
Design Philosophy/theory	1. None is referenced 2. Functional design (goal/use-centered) 3. User-centered design (usability-centered) 4. Actionable design (decision-centered) 5. Other ___	Select all that apply. Look for the authors' own account or description of the design philosophy. In general, the design of the data dashboard may be driven by the intended goal of using data (functional design), by the needs or preferences of the users (user-centered design), or to match a particular decision-making process such as decisions regarding policy or practice (actionable design).
Design process	1. Creator/researcher-driven 2. Creator-driven with user feedback 3. Collaborative / co-design 4. Other _____	This variable is intended to distinguish among less and more collaborative process of developing data dashboards: from creator-driven (no input from users) to a partnership-based process (co-design).

Intended users		Open-ended – briefly describe intended users as per the authors.
Data visualization tools	1. Maps 2. Graphs / charts 3. Tables 4. Timeline / trend 5. Other ___	Select all that apply
Data customization options (interactive component of the dashboard)	1. Selecting/filtering indicators 2. Sorting/grouping (demographics) 3. Sorting/grouping (location) 4. Sorting/grouping (time) 5. Searching 6. Other ___	Select all that apply
Collaborations	1. None referenced 2. Scientific collaboration (with external experts or teams of developers) 3. Funder-developer collaboration (e.g., collaborating with NIH personnel) 4. Industry-developer collaboration (e.g., collaboration with Tableau) 5. User-developer collaboration 6. Community-developer collaboration 7. Other ____	Select all that apply. Look for any information about collaborations on the development, design, and/or implementation and dissemination of the dashboard and who was involved in these collaborations.
PERFORMANCE AND IMPACT EVALUATION		
Dissemination channels	1. Social media 2. News media / journalists 3. Targeted advertising 4. Listserv 5. Email 6. Blogs 7. Newsletters 8. Other ___	Select all that apply. This variable refers to how potential users learn about the data dashboard. It is common to distinguish between push-based strategies (targeting) and pull-based strategies (drawing).
Use/usability indicators	1. Website analytics 2. User ratings 3. Citations/references/mentions	Select all that apply

	4. URL links (external sites that link to or embed dashboard data) 5. Experts' evaluation 6. Users' impact stories 7. Other ___	
Impact indicators		Open-ended – What indicators of impact of use (that is, impact on user knowledge, perceptions, decisions, or actions) are considered by the authors? Separate multiple indicators by semicolon.
Challenges mentioned related to dashboard implementation		Open-ended – What do the authors note as challenges regarding development, design, and implementation of the dashboard (e.g., data quality issues, user skills or training issues, design challenges such as avoiding complex visualizations, financial and/or staffing challenges, technical challenges, etc.). Separate multiple challenges by semicolon.
Challenges mentioned related to research/evaluation		Open-ended – What is reported as challenges to the research study? (e.g., recruitment/participation, sampling / sample size, measurement, inference, generalizability of findings, etc.). Separate multiple challenges by semicolon.