



## USER GUIDE

## Post-Occupancy Evaluation (POE) and Design Audit Tool

## A Population Health-Centric Approach to Post-Occupancy Evaluation (POE) and Design Audits for Community Health Centers and Clinics

Healthcare systems, hospitals, and clinics are integrating population health as a key part of their mission and services. In recent years, there also has been unprecedented growth in community health center/clinic (CHC) renovation and construction, owing partially to the trend in healthcare of advancing population health and reducing healthcare costs. Increasingly, healthcare organizations are leveraging both community and facility environments to engage patients, encourage healthy behaviors, improve access to care, enhance healthy environments, and improve population health outcomes. The CHC organizations are focused on the Quadruple Aim of improving patient experience, improving quality and safety, reducing costs, and retaining physicians and key providers at risk of burnout.

It is imperative for owners, developers, designers, architects, and planners to understand this new landscape and their important role in designing for health. Stakeholders agree that evidence-based design (EBD) of the healthcare environment can help to support these community health goals, and POE findings are a means to establish EBD standards. However, the lack of standardized evaluation tools for gathering data and sharing the results of design evaluation has limited the generalizability and usability of the existing post-occupancy evaluations conducted in community health centers.

With support from the Kresge Foundation, The Center for Health Design developed standardized Community Health Center Post-Occupancy Evaluation (POE) and Design Audit Checklist tools that focus on outcomes, including population health. The purpose is to support the ongoing cycle of evidence-based clinic design and construction by developing resources that enable the evaluation of built projects for their effectiveness in meeting design and performance goals.

There is a two-fold purpose to this guide: to provide an overview of the background, the conceptual framework, and the structure of the toolkit; and to provide a recommended process for using the toolkit to conduct a post-occupancy evaluation. The organization of the user manual includes three sections:

- An Overview of Post-Occupancy Evaluation
- An Introduction to Population Health
- Using the Tools (Design Audit Checklist and Post-Occupancy Evaluation)

*The recommendations included in this guide are intended to be general directions, not prescriptive instructions.* This is because every facility or building project is unique and the appropriate process for conducting POEs may vary significantly among facilities and building projects.



## An Overview of Post-Occupancy Evaluation

Evaluation and feedback are key components of the continuous improvement of the built environment. Post-occupancy evaluation (POE) is the process of systematically and rigorously evaluating buildings after construction and occupancy and providing feedback for improvement (Preiser, Rabinowitz, & White, 1988). Originating in late 1960s, POE has been widely used by government agencies as well as the private sector. An organization can gain significant benefits from a POE in several ways (Blyth, Gilby, & Barlex, 2006; Preiser, 2001):

### Short-term benefits

- Identify and solve problems in the built environment
- Fine-tune the building (including space utilization) in response to user needs and feedback
- Verify the design functionality and the conformance with design requirements

### Medium-term benefits

- Inform ongoing building adaption due to changing organization needs
- Adjust the repetitive design solution that can be used on recurring basis
- Test innovative design solutions

### Long-term benefits

- Facilitate decision making or justification about future actions and expenditures
- Generate knowledge about effects of building design on occupants and organizations
- Improve the overall design quality of similar types of facilities

The benefits of POEs can be expanded when the results are shared with a larger community as opposed to limiting the dissemination within individual organizations that conduct the evaluations. This more transparent approach of information sharing may enable shared learning through benchmarking individual facilities with other similar facilities (Blyth et al., 2006).

## An Introduction to Population Health

Population health was first defined by Kindig & Stoddart (2003) as “the health outcomes of a group of individuals, including the distribution of such outcomes within the group” (p. 381). This includes the determinants of health, as well as health outcomes. Social ecological models (SEMs) of health show the interconnected nature of multiple factors, both personal and environmental (e.g., behavior, physical environment, culture) in determining the health of the individual or population (Sallis et al., 2006; Sallis, Johnson, Calfas, Caparosa, & Nichols, 1997; Stokols, 1992). As a part of population health, there is a natural shift away from the term patient, and towards population and community. Population health can have a global scale, but it is most effective when focusing on the needs and health drivers of a specific population and recognizes the unique drivers of region, culture, and demographic variables. There has been increased demand for healthcare services from a population that has more chronic and complex conditions during a time when financial reimbursement for care is becoming more challenging (i.e., moving from volume to value). The Institute of Healthcare Improvement (IHI) proposed three primary aims of healthcare reform termed the Triple Aim. These aims include “improving patient experience of care (e.g., quality, satisfaction), improving the health of populations and reducing the per capita cost of health care” (Berwick, Nolan, & Whittington, 2008).

Population health is driven by a focus on understanding the underlying factors impacting the health of a population or group. Population health is often discussed with respect to determinants such as social/economic factors, the physical environment, clinical care, and healthy behaviors (County Health Rankings & Roadmaps, 2010; Malecki et al., 2014; Peppard, Kindig, Jovaag, Dranger, & Remington, 2004). This is summarized in Figure 1, which is inspired by two widely cited models (County



Health Rankings & Roadmaps, 2010; Steifel & Nolan, 2012). While the physical environment is sometimes cited as a minor contributor to health, there are a multitude of indirect factors of the built environment that influence all other determinants of health (e.g., health behavior). According to Ricketts (2002, p. 14), “Health as a function of lifestyle, diet and exercise may be considered exclusively within an individual’s control but the ability to exercise and the diet choices available to a person are tied to their lived space.” The range of design implications varies from macro- to micro-scales and there are many aspects of the built environment that underlie each of the determinant categories.

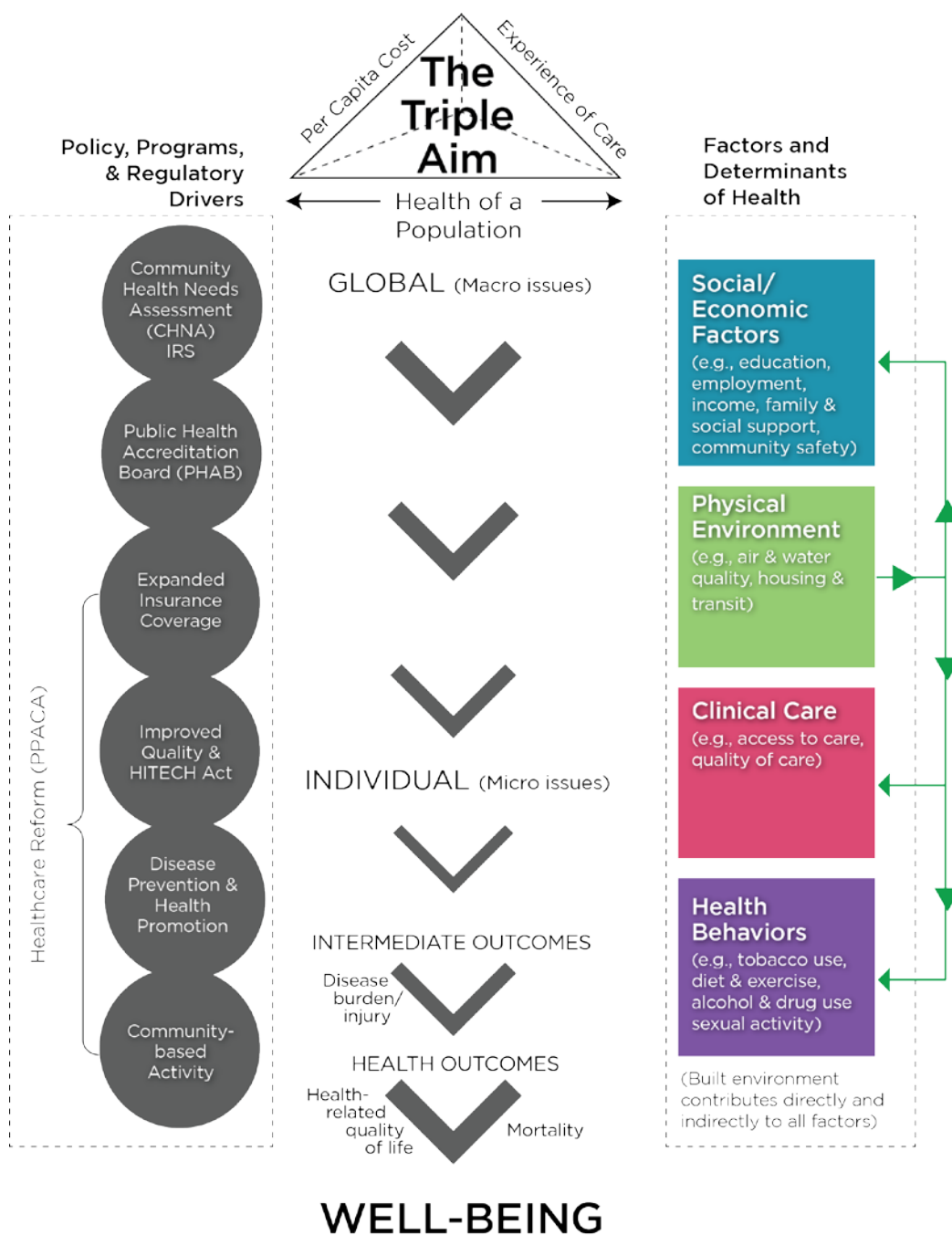


Figure 1: Population health model inspired by County Health Rankings & Roadmaps, 2010; Steifel & Nolan, 2012



### *Population Health and the Built Environment*

Given the increasing focus on community health and preventive medicine, it is important that healthcare organizations and the communities they serve incorporate built environment strategies that result in healthy behavior. A large body of research (supported by funding from the Robert Wood Johnson Foundation's Active Living Research Program) has emerged to show how the design of neighborhoods, communities, and buildings can promote physical activity and reduce obesity. This research focused on the development of parks and recreational facilities, schools, offices, communities, and urban planning policies and has already led to change in many cities across the United States. However, these strategies have been mostly adopted at the neighborhood level and at the building level (e.g., schools, offices). Healthcare organizations have not been at the forefront of adopting these strategies in their own facilities nor have most leveraged their building programs to support physical activity and to improve healthy behavior in their communities.

Healthcare systems must tailor their approach to meet their population's drivers and needs, which may now be initiated through a mandated Community Health Needs Assessment (CHNA) (IRS, 2014; Stoto, 2013). Findings from CHNAs address population health by prioritizing the most vital needs of the community (Centers for Medicare & Medicaid Services, 2016) and can offer great opportunities for designers and facility planners to think outside the box. Primary care, which provides 60% of all U.S. patient visits (Centers for Disease Control and Prevention, 2016), plays a critical role in promoting population health by delivering comprehensive care in the context of communities for a wide range of health(care) needs (Long, Khan, & Chana, 2015).

It is important to note that there are few direct causal links between population health and the built environment. Instead, there is more likely a probable association between some aspects of design with behavior, which in turn influence health. These associations are complicated by confounding variables. A conceptual framework to support designing healthcare environments for population health was developed to align with the model found in Figure 2. This highlights the determinants of health mediated by environmental conditions as affordances to environmental exposures that contribute to intermediate outcomes of injury and disease. While represented as a simplified organized structure, there often is overlap as part of a "one to many" set of relationships. For example, facility location is most directly aligned to access to care (clinical care factor), but it can also be seen as part of the physical environment through site design, as well as part of a larger urban-scale plan to address socioeconomic factors. In many cases, each built environment condition also offers affordances to multiple exposures.

### *Conceptual Framework of Community Health Center POE*

A POE at one specific CHC facility should focus on how the environmental design supports the achievement of organizational goals relevant to this particular facility. During the design process, these organizational goals are translated into a set of specific **population health design goals** and design features. Again, it is important to note that links between population health and the built environment are most often mediated by behavior which influences health. The design decisions lead to a set of **healthy behaviors and health status**, and eventually high-level **population health outcomes** after occupancy.

A conceptual framework based on a research literature review and expert opinions illustrates the relationships between variables for evaluation. The POE results will be used to confirm whether the design intents are realized and to adjust organizational goals in future design phases, renovation, or construction.



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## Using the Tools

### *Team composition and participants*

Note: Ideally, the POE and audit process will involve an interdisciplinary approach that includes members from the design side and the health center side.

- **Community Health Center Team**

Both leadership support and staff participation are important for the success of the community health center POE. From the beginning, a core team should be organized to include at least one member or representative of the leadership team of the organization and one or more individuals who have working knowledge about the facility design, daily operation of the center, and various data collected in the clinic and the organization. One member of the core team should be assigned as the main responsible person who takes ownership and serves as the representative of the CHC POE/audit process.

- **Design Team**

During the design process, a design team should decide if they will use the audit checklist tool, the POE tool, or a combination of both to inform design decisions (audit) and evaluate outcomes post-occupancy (POE). Early in the design process, the design team should designate at least one champion who is both involved in design decision making and knowledgeable about broad and specific goals for the project. Involvement in meetings with health center leadership, user-group meetings, and design team meetings is highly beneficial.

### *Process*

Below is a brief description of the typical process of using the POE and audit checklist tools. Though the process is intended to be widely applicable, individual facilities may make adjustments based on their specific situations. A more thorough overview of the evidence-based design research process can be found in other publications such as the EDAC Study Guide 2 (The Center for Health Design, 2014).

There are three main steps of the POE: planning, data collection, and reporting and benchmarking the results.



Figure 3: Typical process for using POE and audit checklist tools

- **Planning**

In the planning stage, an organization needs to make the following key decisions around the POE:

- The main purposes of conducting the POE
- The facilities or buildings to be included in the POE
- The core team composition





- The available resources (both internal and external) including staff time and funding for external consultants and contractors if needed, and the timeline including major milestones
- The data to be collected

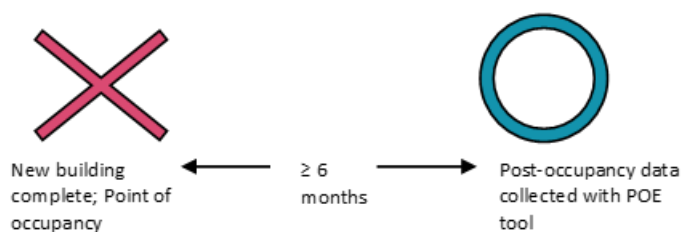
Depending on the availability of resources and purposes of conducting the POE, a facility may opt to complete only the audit, or only the POE. Depending on the specific organizational goals, they may decide to complete only certain sections of each tool. However, we strongly recommend completing as much of both tools as possible to produce relatively more comprehensive and useful findings. The organization of the core team and the completion of a detailed POE plan are the two major results of this stage. The POE plan should document all the above decisions.

### • *Data collection*

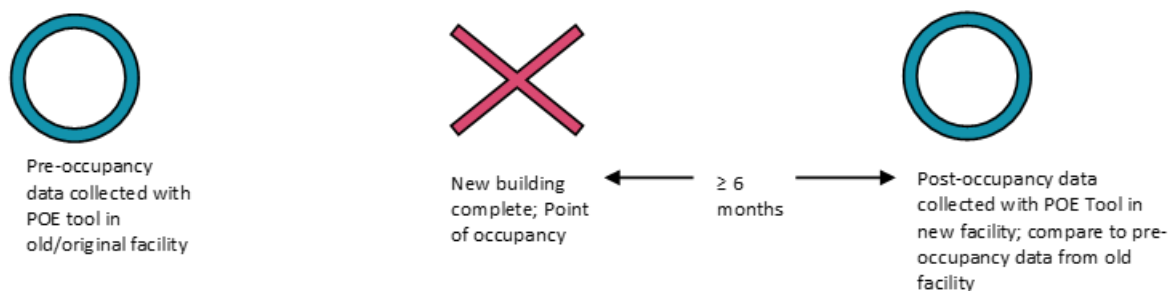
Note: Depending on each facility's specific needs, various combinations of the following POE and Audit tool scenarios should be considered.

The **POE tool** should be completed in a new facility at least six months after occupancy to avoid biases due to any “honeymoon” effects. In cases of replacement or renovation, the tools can also be used in the old/original facilities to collect baseline (pre-occupancy) data. This enables comparisons to be made to examine the relationships between building design and outcomes. It is recommended that the evaluators bring an easy-to-carry laptop or tablet to record information in the Excel file. A printout of the tool can also be used. If using the pdf version, a printout may be easiest, though most versions of Adobe Acrobat allow a form of commenting in an electronic file. A digital camera/smartphone for photos should also be used. Two scenarios for use are provided in Figure 4, below.

#### POE Option 1



#### POE Option 2



*Figure 4: Two scenarios for POE tool use*

The evaluators will walk through various spaces from building exterior (e.g., gardens and parking lot), waiting areas, patient-clinician interaction space, staff workspace, exit/checkout). The tool lists a set of design features in each type of space that are supportive of the population health design goals. Each auditor verifies independently whether each design feature is implemented and on a 5-point scale how well it meets one or more criteria listed in the tool. After the completion of the evaluation in the Excel file, the scores for individual design features and spaces will be



automatically calculated and summarized in the “Results” tab. If paper and pen were used during the walk-through, then evaluators or other staff members will need to calculate the score for a specific design feature (as an average of all criteria for the feature) and the score for a specific type of space (as an average of all design features implemented in the space). Photos taken during the walk-through as well as floor plans should also be stored with other POE documents.

**The Design Audit** is intended to be used by an interdisciplinary team including a facility manager or other individual who is familiar with the facility design operation as well as designers and selected front-line staff members. The audit checklist can be used during the design process as an evaluation of the design plans or post-occupancy. If it is used during the design process it can be completed once, or multiple times from schematic design through design development, by referring to plans as a means to track the status of certain evidence-based design goals. If the audit checklist is used on site post-occupancy, it is recommended that the evaluators bring an easy-to-carry laptop or tablet to record information in the Excel file. A printout of the tool can also be used. If using the pdf version, a printout may be easiest, though most versions of Adobe Acrobat allow a form of commenting in an electronic file. A digital camera/smartphone for photos should also be used.

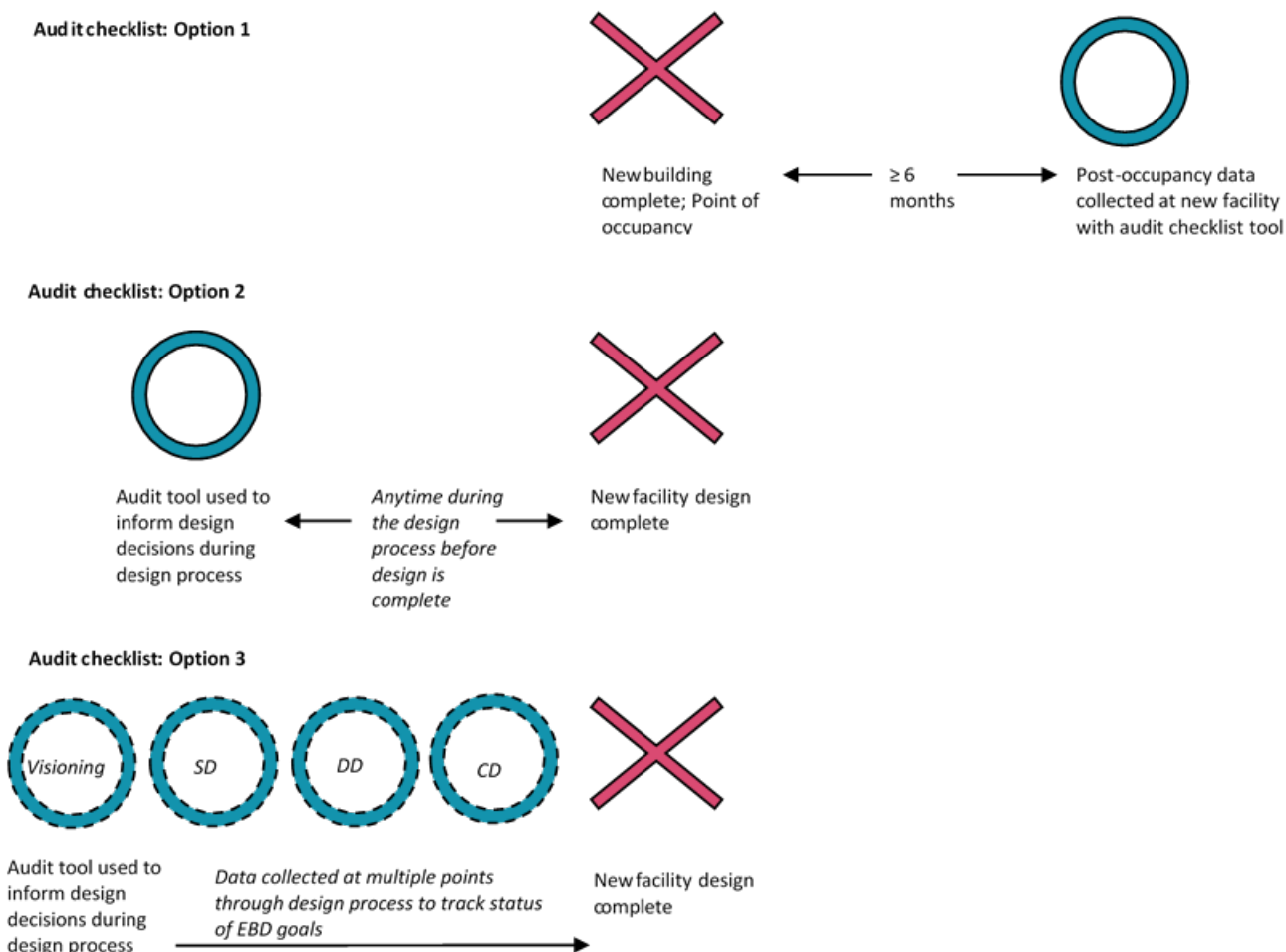


Figure 5: Three scenarios for design audit checklist use





The evaluation team will walk through various spaces from building exterior (e.g., gardens and parking lot), waiting areas, patient-clinician interaction space, staff workspace, exit/checkout). The tool lists a set of design features in each type of space that are supportive of population health. Each evaluator verifies independently whether a design feature is implemented. It may be helpful to take photos or screen shots of design plans for each type of space included in the tool. Three scenarios for use are provided in Figure 5.

- *Analyzing, reporting, and benchmarking*

After the data collection is completed, the POE team should double-check to verify the completion and consistency of data before conducting descriptive or more in-depth analyses. It is recommended that an experienced researcher lead the data analysis and result interpretation process. The data analysis process should be determined according to the purpose of POE. Several examples of data analysis include:

- Evaluation of the design features relevant to the project goals and intents to identify the weak points (e.g., the lowest-rated design features or aspects, or the negatively perceived environmental aspects [rated lower than 3 on surveys]). Further actions can be taken to remedy the weaknesses in the built environment based on lessons learned from the POE.
- Descriptive comparisons between similar facilities within a same healthcare organization to identify the differences in the physical environment design.
- If data has been collected for both the old (original) and new facilities, descriptive comparisons can be made to verify whether the design intents have been realized (i.e., whether ratings have improved).

The findings from the POE can be written up and shared internally with facility administrators, staff, and patients in a variety of formats (e.g., full report, summary) and externally to contribute to the industry knowledge base (e.g., article, presentation).

### *Tool Structure and Scoring*

The toolkit includes a set of tabs that correspond to six major spatial components of a health center:

- Building exterior
- Interior-Overall
- Waiting/Check-in
- Patient-clinician interaction spaces
- Checkout
- Staff spaces

The tool can be used during design as an audit or as a post-occupancy evaluation. Evaluators will walk through each component of space and mark on the tabs whether:

- (1) the design features listed are a priority (when used as a design audit) or
- (2) how well the implemented design features achieve the design intent using a 5-point scale (for a POE).

The tool is recommended to be used independently by a team including designers, facility managers, and frontline staff during a walk-through audit, followed by a focused discussion to resolve any possible conflicts in ratings.



### Tool Versions and Access

The pdf version of the POE toolkit is publicly accessible through The Center for Health Design website ([www.healthdesign.org](http://www.healthdesign.org)). The toolkit is designed to be self-administered so that individuals can download and use the POE toolkit by themselves. An Excel version of the toolkit with more robust functions in automatic scoring calculation is available with The Center's Affiliate+ membership. This includes a summary of priority scoring for design audits, percentage of items scored for a POE, POE averages for each goal, etc.

The Center's research team also provides advisory services ranging from toolkit customization to support better fit of other outpatient facility types; assistance in conducting the POE; and unbiased analyses, review, and interpretation of results.

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