Exhibit interior rendering for *In Sickness and In Health*, one of the illustrations developed during the schematic design phase to show key moments in the visitor experience.

Design-Thinking Approaches to Exhibition Development

Investigating New Ways of Working

Naomi Crellin, Lauren Telchin Katz

Developing exhibitions for a large, national museum – like Washington, DC's National Museum of American History at the Smithsonian Institution – takes a village. Multiple players are required to ensure that all roles and voices are captured in the process of exhibition development. For some projects, this includes a blend of in-house staff and external contractors. However, in recent years, new ideas about how to improve and streamline the exhibition process have emerged. We are the exhibition contract designer/creative strategist and project manager of an upcoming exhibition at the Smithsonian Institution's National Museum of American History (NMAH): *In Sickness and In Health*. For this 3,500-square-foot, long-term exhibit, scheduled to open in late 2019, we employed such new approaches.

At NMAH, exhibition teams follow traditional models. They are typically comprised of museum employees, led by a project director (usually a curator) and a project manager. Team members generally include a designer, an exhibit developer, a collections manager, a conservator, as well as individuals representing critical museum functions, such as fabrication, public affairs, and advancement. For larger galleries, NMAH will frequently contract with an exhibition design firm. In cases when the exhibition designer is not a staff member, NMAH also assigns a design manager to represent the museum's design aesthetic and ensure seamless facilitation and integration with the building's architecture and mechanical systems. Usually, teams work through the different phases of an exhibition project
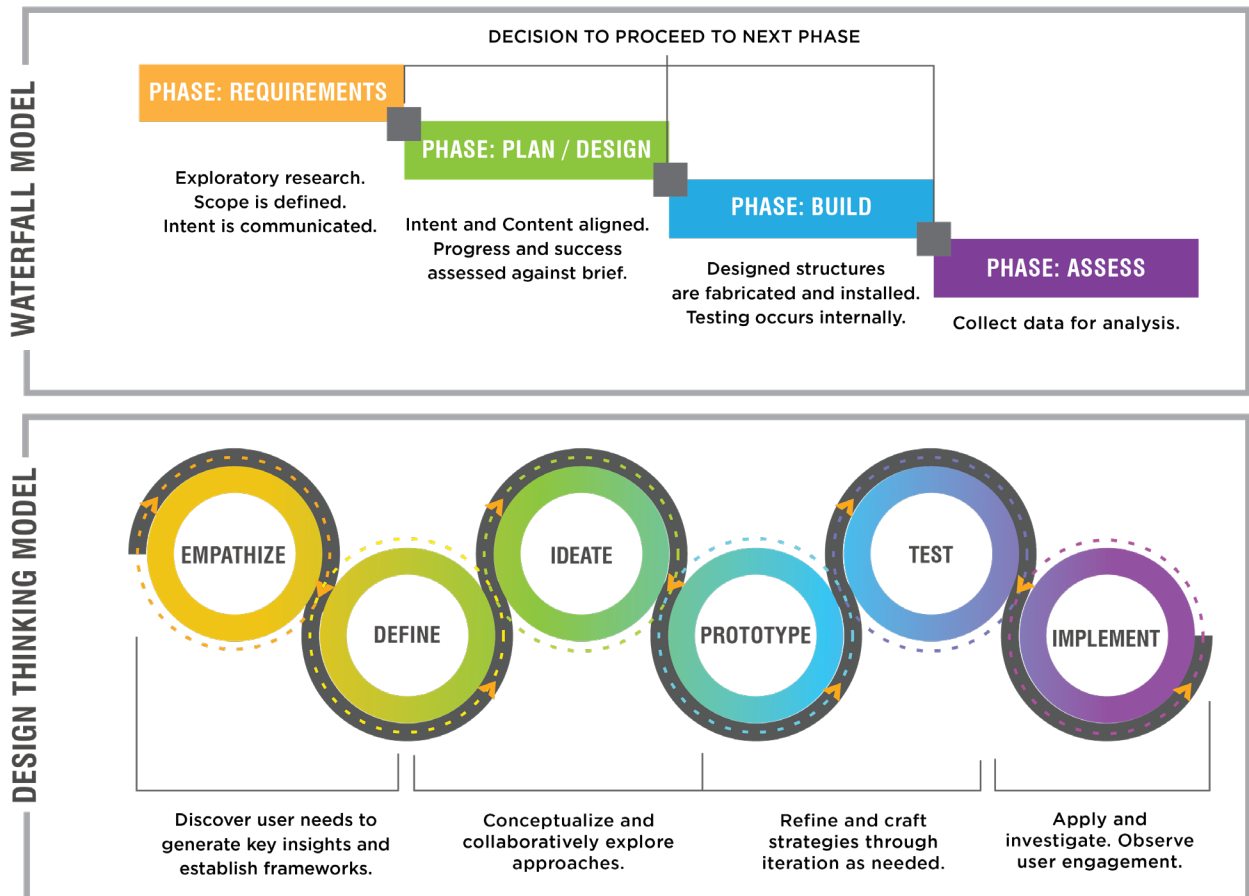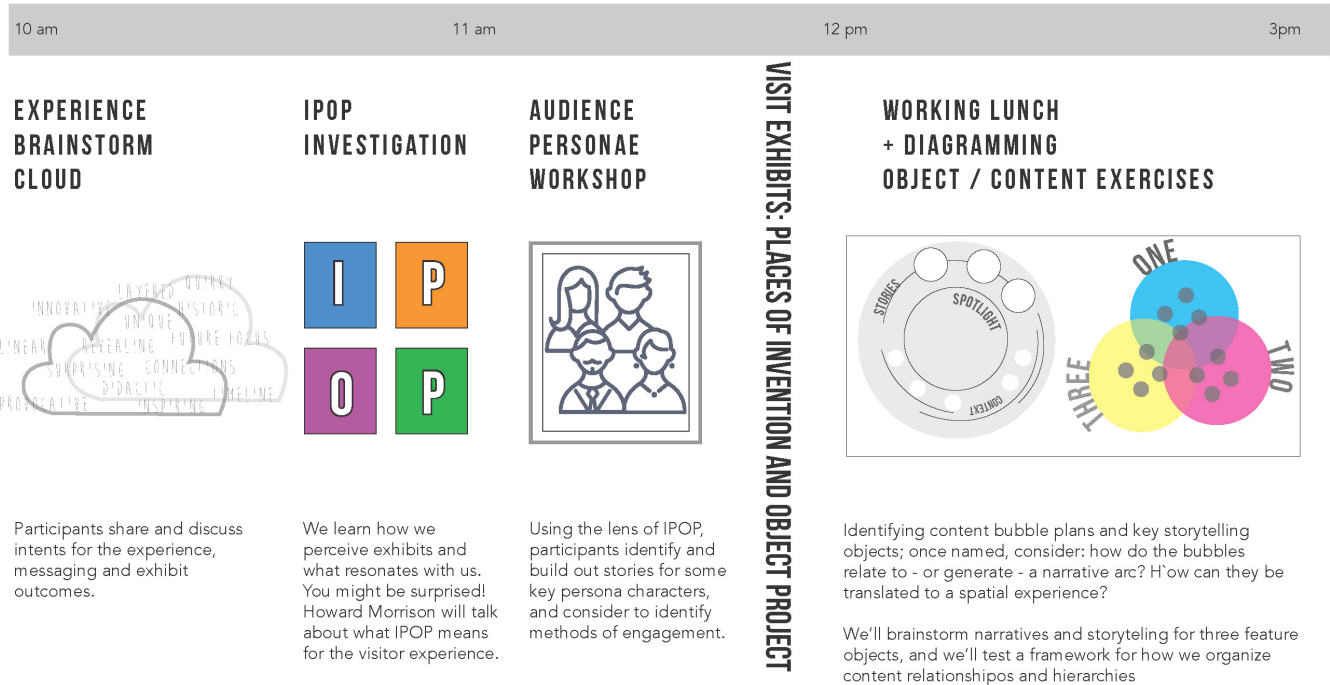

WATERFALL MODEL

DECISION TO PROCEED TO NEXT PHASE

PHASE: REQUIREMENTS
Exploratory research. Scope is defined. Intent is communicated.

PHASE: PLAN / DESIGN
Intent and Content aligned. Progress and success assessed against brief.

PHASE: BUILD
Designed structures are fabricated and installed. Testing occurs internally.

PHASE: ASSESS
Collect data for analysis.

DESIGN THINKING MODEL

EMPATHIZE   DEFINE   IDEATE   PROTOTYPE   TEST   IMPLEMENT

Discover user needs to generate key insights and establish frameworks.

Conceptualize and collaboratively explore approaches.

Refine and craft strategies through iteration as needed.

Apply and investigate. Observe user engagement.

fig. 1. A comparison of waterfall versus design-thinking models.

CHANGING AMERICAN MEDICINE - CHARETTE VISUAL AGENDA

WEDNESDAY JUNE 7TH 2017

10 am	11 am	12 pm	3pm

EXPERIENCE BRAINSTORM CLOUD

IPOP INVESTIGATION

AUDIENCE PERSONAE WORKSHOP

VISIT EXHIBITS: PLACES OF INVENTION AND OBJECT PROJECT

WORKING LUNCH + DIAGRAMMING OBJECT / CONTENT EXERCISES

Participants share and discuss intents for the experience, messaging and exhibit outcomes.

We learn how we perceive exhibits and what resonates with us. You might be surprised! Howard Morrison will talk about what IPOP means for the visitor experience.

Using the lens of IPOP, participants identify and build out stories for some key persona characters, and consider to identify methods of engagement.

Identifying content bubble plans and key storytelling objects; once named, consider: how do the bubbles relate to - or generate - a narrative arc? H`ow can they be translated to a spatial experience?

We'll brainstorm narratives and storyteling for three feature objects, and we'll test a framework for how we organize content relationshipos and hierarchies

fig. 2. The visual agenda, from one of the initial "envisoning workshops," shows a series of exercises intended to help the team identify – and get traction – behind shared goals for the exhibition.

utilizing a waterfall approach: a sequential process where no phase begins until the prior phase is complete (fig. 1). This management style, coupled with the large group of contributors that is typical for a museum of our size, often leads to inertia and a lengthy (read costly) development process. As a result, it can take years to realize an exhibition.

In June 2017, as we began to plan *In Sickness and In Health* – which highlights NMAH's medical collection – we decided to experiment with design-thinking techniques that borrow from Agile project management and rapid development, two models more commonly used in non-museum settings (fig. 2).[1] In this article, we share key learning from our experiences with what we've dubbed "AxR."

Agile project management is an iterative development methodology that values human communication and feedback, adapting to changes, and producing working results.[2] We felt that this approach was

1   For more information on Agile, waterfall, and design-thinking practices, see Clare Brown, "Unboxing History Exhibitions: Experience Design in Museum Practice," in *The Future of Museum and Gallery Design: Purpose, Process*, edited by Suzanne MacLeod, Tricia Austin, Jonathan Hale, Oscar Ho Hing Kay (New York: Routledge, 2018).
2   Conrad, Andrew, "What Exactly is Agile?" *Capterra*, April 27, 2018, https://blog.capterra.com/definition-of-agile-project-management/.

exactly what was needed for this project structure in order to break away from the inertia generated by a large group accustomed to more isolated and linear ways of working. Additionally, we believed it would help us overcome a specific and unexpected challenge: at the end of the concept design phase, the team had lost several months due to a missed contracting window for the exhibition's contract designer/creative strategist. Once the project resumed, we definitively decided to adopt an Agile approach. Not only did we like some of the basic elements of Agile – including the importance of in-person meetings; frequent, informal communication; stakeholders collaborating on regular basis; and a strong emphasis on design thinking – but we felt it would help us meet an aggressive schedule without adding additional time.

Like Agile, **rapid development techniques** also use an "iterative loop" approach that is key to the design-thinking process, and supports it with such methods as "design sprints," "timeboxing," and "chunking."[3] While it originated in software application development, rapid techniques were especially appropriate for this project because of its extremely compressed project schedule goal. Swift progress was crucial.

Our AxR approach would include a number of techniques drawn from both of these. We decided that we would facilitate and actively sketch during workshop sessions that would allow the team to quickly discuss and test

3   Ellen Gottesdiener, "RAD Realities: Beyond the Hype to How RAD Really Works," in *Application Development Trends*, August 1995, www.ebgconsulting.com/Pubs/Articles/RAD_Realities_Beyond_the_Hype_Gottesdiener.pdf.

> Like Agile, rapid development techniques also use an "iterative loop" approach that is key to the design-thinking process, and supports it with such methods as "design sprints," "timeboxing," and "chunking."

the efficacy of ideas and how they might function for the visitor experience. We would also build an executive team structure that included a designer and developer; build consensus around a strategic manifesto; reach binding decisions through iterative prototyping; and use frequent yet informal collaborative communication.

The National Museum of American History organization had been used to a waterfall process, moving sequentially through the design phases of concept design, schematic design, design development, and final design prior to contracting and fabrication, with each stage subject to an executive review (including input from fundraising/development and the director's council) followed by a technical review (from facilities, life safety, and other technical experts on staff). Now, with our new AxR method, we made a key decision: instead of using this traditional approach, we would run the technical reviews in tandem with executive reviews. This way, for example, we could continue making progress on technical drawings (revisions for codes, materials,

security, etc.) instead of pausing the whole project's momentum while executive discussions were ongoing – revising or reorganizing graphic content and finessing object selection, for example.

Getting Traction + Building Frameworks

While some of the exhibition team members for *In Sickness and In Health* had previously worked together on a number of smaller exhibitions – each generally directed by a single curator – they had never collaborated on a large-scale exhibition. There were a lot of great ideas, a lot of areas of expertise and passion, a lot of energy and enthusiasm, and a *huge* desire to produce a significant exhibition. However, despite best intentions, after struggling for months the group had not been able to align behind a cohesive concept. We, along with the project director, felt that AxR would give us the new way of working that we needed . We began by examining and adjusting the normal team structure and hierarchy.

Because of the scale and visibility of the exhibition, the management team at NMAH decided to contract with a local designer to help support the project development as it began to take shape. Typically, the designer role would be played by a staff member, but the management team had great interest in having new ideas brought to the table for this project, and felt that an outside perspective might help move the large team forward. This unique need was reflected in the designer's contract, which called for a pre-project kickoff to include several workshops. These "ideation charrettes" brought staff

and advisors to the table to discuss content and direction, and included design-thinking exercises that helped the group reach a shared understanding of the exhibition intent and design concept.

In response to the discussions that took place at these workshops, the contract designer/creative strategist generated a series of visualizations to capture the group's thinking, help to track the decisions they were making, and enable informed choices to be made about the project's direction moving forward. The traditional model, described earlier, of director and project manager at the fore, had now shifted in this case to include a creative strategist – essentially, the designer empowered to help guide strategic decisions (fig. 2, p. 91).

A component of this approach was the fact that there were multiple curatorial voices on the team and that a creative strategist would help bring all points of few together in a visually and intellectually cohesive exhibition. Yet, as the team gathered momentum behind a cohesive concept, it was clear that standard processes for design and project delivery would need to look different than a typical project at NMAH. With so many competing ideas and objects vying for space in the exhibition, we put our heads together to determine how to best be successful on the project. Together, we made the recommendation to create two structures that would enable the rapid and binding decision making that would be critical for the AxR approach: an executive team and a project manifesto.

The "executive team," a new leadership structure for NMAH, allowed the project to move forward rapidly by consolidating decision making with a smaller leadership group. Typically, full project teams could include as many as 20 staff members representing different points of view and job functions, and were expected to come to consensus. In our early, pre-AxR workshops, we'd found we could not make decisions that would stick with a group that large. Instead, this executive team was charged with making the necessary decisions to keep the project moving forward.[4] The team included the project director (in this case, Alexandra Lord, chair of the Division of Medicine and Science at NMAH), the contract designer/creative strategist, the exhibit developer, and the project manager. Other members of the extended team included curators representing different

4   This approach was seen as quite successful by NMAH and is being used by the project manager on another large-scale exhibition project.

areas of expertise in the medicine collections, a design manager whose role is to guide a contract designer through Smithsonian's complex system of technical reviews, a conservator, and a collections manager.

In this concept phase, the executive team convened for weekly informal meetings where they framed the agenda for the larger team meetings, made decisions, and set priorities based on their assessment of what the team needed. Additionally, the project director assumed responsibility for interfacing with the curators and engaging them as subject matter experts – instead of having lengthy team meetings with other functions present. Now, the curators met as a standalone group, and the project director reported out to the other executive team members. When a difficult content decision needed to be made, the project director solicited input from the curators but was empowered to make decisions independently. We were especially fortunate to have a
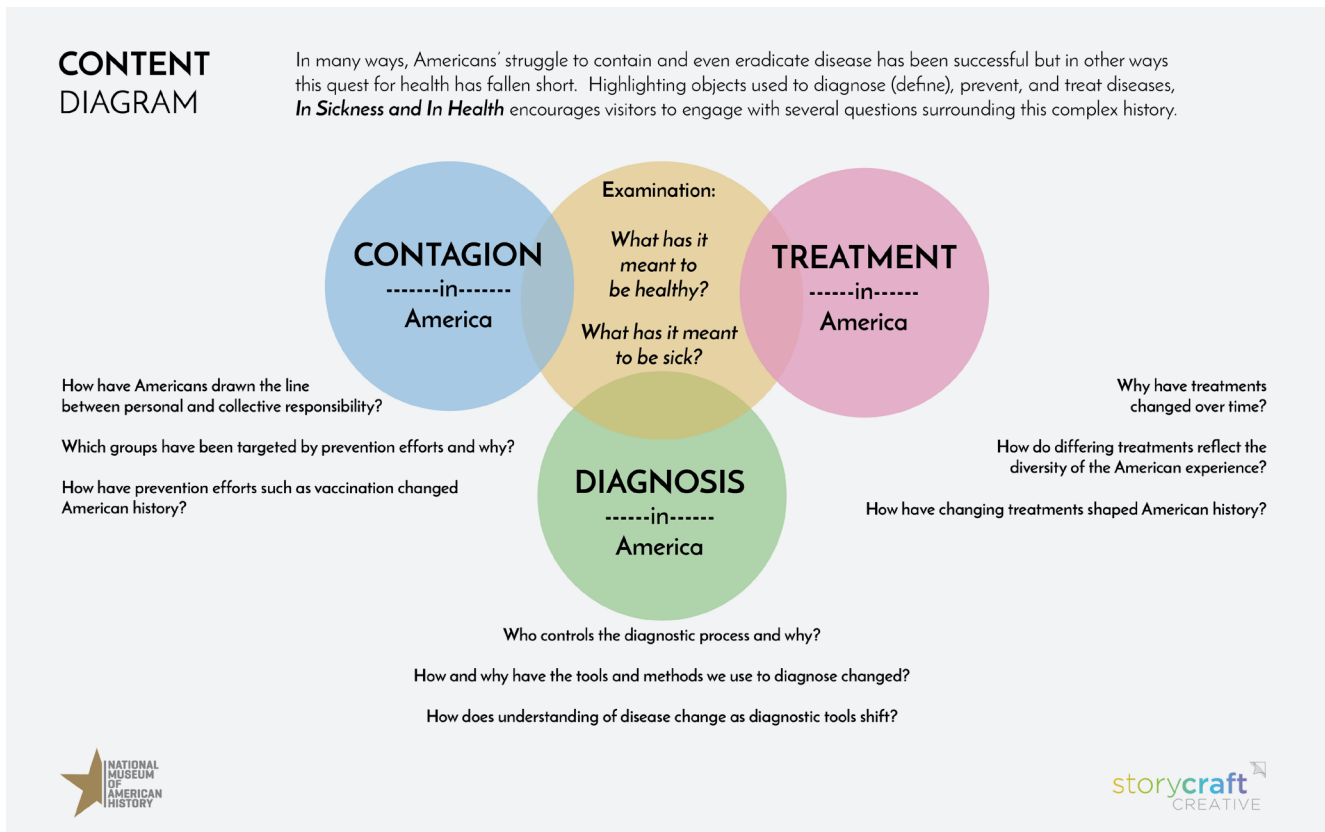
THIS EXHIBIT

fig. 3. The exhibit manifesto developed for the *In Sickness and In Health* project captured parameters around content inclusions, curatorial approach, tone of voice and program structure, all of which were discussed and agreed upon by the entire team.

IS NOT	IS
✗ About pivotal moments or points in time	✓ In response to a core question
✗ Inclusive of all aspects of medical history	✓ Inclusive of multiple perspectives
✗ A 'highlights of the collection' exercise	✓ Organized around a central narrative arc
✗ Reliant on external loans or commisions	✓ Telling stories featuring the SI collection
✗ Speaking only to subject matter experts	✓ Speaking to a contemporary NMAH audience
✗ An amalgam of different silos/areas of expertise	✓ A cohesive and integrated experience

fig. 4. The content narrative diagram flowed more naturally once the manifesto was in place. Visual articulation of content decisions helped the group to clarify a complex narrative as it related to the visitor experience.

CONTENT DIAGRAM

In many ways, Americans' struggle to contain and even eradicate disease has been successful but in other ways this quest for health has fallen short. Highlighting objects used to diagnose (define), prevent, and treat diseases, *In Sickness and In Health* encourages visitors to engage with several questions surrounding this complex history.

CONTAGION
-------in-------
America

Examination:

What has it meant to be healthy?

What has it meant to be sick?

TREATMENT
------in------
America

How have Americans drawn the line between personal and collective responsibility?

Which groups have been targeted by prevention efforts and why?

How have prevention efforts such as vaccination changed American history?

DIAGNOSIS
------in------
America

Why have treatments changed over time?

How do differing treatments reflect the diversity of the American experience?

How have changing treatments shaped American history?

Who controls the diagnostic process and why?

How and why have the tools and methods we use to diagnose changed?

How does understanding of disease change as diagnostic tools shift?

NATIONAL MUSEUM OF AMERICAN HISTORY

storycraft CREATIVE

project director who was comfortable in this role, who had a great depth of experience, and was the department chair; we could not have been as successful without this level of seniority.

The other structure we implemented was the exhibition manifesto. The contract designer/creative strategist led the full team through exercises to develop and agree to the tenets by which the exhibition would be intellectually structured and approached. This idea emerged after we made limited progress in early workshops because team members had different views of how to ensure the strongest objects and stories would be utilized. Everyone acknowledged that the lack of focus was adding to sense

of frustration and inertia, and agreed to adhere to the manifesto (fig. 3).

The manifesto is a useful tool. As we worked toward concept designs, the team met for six weekly workshops. As we worked, the team evaluated each object, story, and idea against the principles of the manifesto. If something didn't fit, we eliminated it. Because everyone appreciated and respected this approach, we were able to cut down on what we call "The Swirl" – an endless discussion of good ideas, objects, stories, and potential design ideas without making decisions or understanding the impact on the whole experience. By focusing on the manifesto, the team could immediately assess if an idea worked or did not (fig. 4).

Navigating Barriers + Supporting Change

Through this experience, we've seen that the use of AxR processes can help to find flow around sometimes immutable organizational structures: it *is* possible to run an Agile process within a traditional framework, but it takes strategic alignment and navigation led by, in this case, the project manager, contract designer/creative strategist, and project director. We are finding that even beyond this particular project example, the smaller group of key decision makers (again, the project director, manager, exhibit developer, and contract designer/creative strategist) is proving to be an effective way to set priorities and balance competing interests. We are fortunate that all the team players in this project were open to new ways of working, including – and especially – the curatorial project director.

We encountered another delay as we approached the end of the schematic design phase, which meant design work had to pause. The team decided, with support from NMAH management, to use this time to obtain an independent cost estimate. Typically, projects of this size and scale are built by outside fabrication firms, with those bids for building being issued at the end of design. The team wanted to ensure that we were designing something that could be built for the budget prior to the fabrication solicitation process. We used this time as an opportunity to conduct a cost-estimating exercise. The feedback provided was invaluable, as it helped us realize that to stay within budget, we would need to reduce the number of objects by approximately 30

percent (although we could keep our story lines intact). Additionally, we found cost savings in the way were going to approach case construction.

In the end, the delay generated a more robust product, refining design concepts for budget at a point where adjustments felt natural. From a contracting perspective, it is important to note that the flexibility and iteration needed for AxR processes has material impact, increasing the amount of design time needed. As a result, it helps to work with a designer who is embedded with your team or available so that frequent conversations can take place easily.

At the start of every workshop, the project director, manager, and contract designer/creative strategist explained its goal and how it fit into the overall project phase.

Beyond the workflow delays that further compressed and shifted the project schedule, it's true that asking to shift ways of working can be a challenge, both for an organization and for the individuals that operate within the organization. Change can be good, but getting buy-in for new and different approaches can be challenging. As project manager and contract designer/creative

strategist, we have great empathy for this project team as they tried new ways of working – being asked to collaborate heavily, work flexibly and extremely swiftly, and open themselves up to group discussion of ideas. We have been fortunate that the project director embraced innovation and strategic adjustments that supported the project's progress, and that the team was also open to new ways of working. Together, leadership and empathy have helped the process and enabled the team's work to move forward at a good pace.

It has also helped to openly acknowledge changes in approach and to recognize that we are testing new ways of working, together. At the start of every workshop, the project director, manager, and contract designer/ creative strategist explained its goal and how it fit into the overall project phase. For NMAH curators who typically work on exhibition projects sporadically, especially at this scale, it helps them understand each project phase as a component of a larger piece of work.
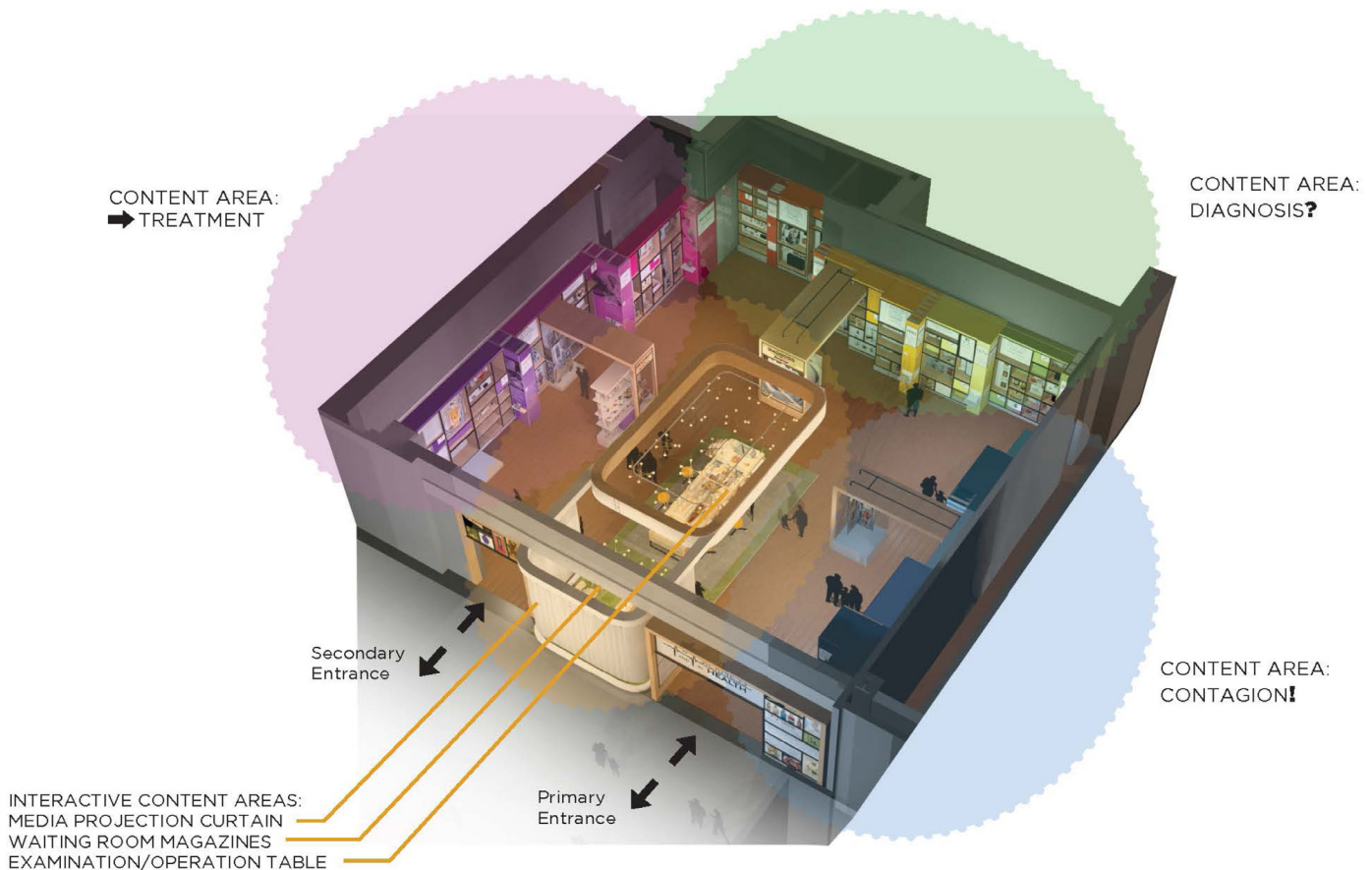
This empathy for the team was especially important when curators were asked to generate significant volumes of work in an accelerated fashion. In a traditional NMAH approach, a curator has months to individually consider which objects and stories to include during the exhibition proposal process, before team members (project manager, designer, exhibition developer and more) are assigned to the project. For *In Sickness and In Health*, we developed a section of the exhibition each week. Additionally, the executive team asked

curators to diverge from models of individual ownership and develop ideas in pairs or groups – a very different way of working. This was not an easy or natural adjustment for the team but it helped to break out of the normal patterns of isolated consideration, to get ideas "on the wall" very quickly for collaborative testing and discussion with the broader group. This was enabled by the project director being the supervisor of the curators: she worked with them to shift their responsibilities to accommodate this task.

Traditionally, large exhibitions at NMAH have multiple curators and the script writing process is linear: each curator writes a section, and then the project director, exhibit developer, and museum editor work to weave these together into exhibition text that has one voice. In this case, the project director wrote the entire script. She met with curators as subject matter experts and then synthesized information and points of view into one singular voice. The result was a more cohesive narrative, streamlined review, and editing workflow – and the draft script was completed in a matter of weeks rather than months. At this point, the exhibit developer and editor joined in to polish the script. The concept of executive team leadership that meets frequently (without the full team) is also replicated on other projects. While the pace of an AxR approach generates resistance, we continue to advocate for the benefits of its use in museums.

Throughout this project, we've used the design visualizations of rapid process ideation to help the team progress. As ideas have been generated, we've fed

CONTENT AREA:
➡ TREATMENT

CONTENT AREA:
DIAGNOSIS?

CONTENT AREA:
CONTAGION!

Secondary
Entrance

Primary
Entrance

INTERACTIVE CONTENT AREAS:
MEDIA PROJECTION CURTAIN
WAITING ROOM MAGAZINES
EXAMINATION/OPERATION TABLE

them back to the team through a variety of media: inspiration imagery, graphic layouts, elevations, treatment options, and 3D-modeling and rendering. This adoption of rapid design's emphasis on the visual depiction of ideas helped to both support more collaborative ways of working and build consensus on decisions. In the rapid processes of digital and industrial design, prototyping means the generation of a tangible product that you can interact with and test. In museum design, our avenue

to prototyping and testing is through digital 3D-modeling and rendering. Very early on, we utilized realistic rendering as a tool. This helped the team members to see their hard work reflected, and to sell their idea within the organization (fig. 5). And, the sophisticated renderings, generated earlier in the process than usual, have proven beneficial to the museum's fundraising efforts (fig. 6). In fact, it has even inspired a similar approach for another project currently underway.

Summary

As we move into final design phases and fabrication, with a target opening in late 2019, we continue to apply an AxR approach as needed (especially with regard to project management and fabrication decisions), but are finding that the traditional structures for design documents and standards remain necessary. So, the greatest impact of the AxR approach is seen in the early to mid-stages of a project's development. However, the benefits extend through – and beyond – the project lifecycle.

As Clare Brown, NMAH's Chief of Design, an expert in the field of narrative exhibition design and development says, "New modes of project management, including those embraced in the AxR method at NMAH, enable a much-needed evolution in how we create exhibitions…. The result is more positive teamwork and the potential to create an exhibition with significantly improved visitor experience" (intro image).[5]

While this case study was unique to a museum the size of the National Museum of American History, here are some key takeaways that we believe could be applied in any museum setting:

5   Correspondence between the authors and Clare Brown, October 17, 2018.

fig. 6. Entrance rendering for *In Sickness and In Health,* one of the illustrations developed during schematic designs to show key moments in the visitor experience.

- **Establish strategic team frameworks** that ensure there is someone in charge with decision making authority. Bigger projects will benefit from the executive team model we employed here – with the project director, project manager, and designer at the table.

- **Bring in a designer/creative strategist as early as possible.** They can help write successful briefs that provide clear creative direction, and even earlier in the process can help visualize content structures and decisions that enable curators to better communicate ideas to others.

- **Establish and use an exhibit manifesto** – a tool to clarify what the project is and is not – and refer back to it frequently. This document helps make tough decisions easier, and helps in communicating goals and expectations for the project.

- **Engage fabrication partners that are consulted early in the process.** Starting cost estimating early helps to avoid surprises later on, and connecting the designer with a fabricator to discuss ideas for materials and methods improves working relationships and increases efficiencies in the final design.

- **Be open and communicative.** If you are trying new ways of working, let people around you know. Be open to constantly assessing what is working, and what is not. Maintain a flexible mindset and seek opportunities to innovate when you are presented with a challenge. You'll find that you get broader organizational buy-in and support from your project team if they understand how they are contributing an innovative approach.

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