

Design Brief

CIE.

A Transformational Approach.



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The problem

Patients in the United States' healthcare system today face a number of challenges when it comes to the medical billing experience. Some complaints patients had as per the Mad Pow research report⁷ were:

- high volume of info
- low understandability
- lots of jargon
- very few visual graphics
- lots of paper bills
- no easy way to estimate cost of visit
- software that is not tested with patients/humans
- no clear call to action

This frustration-riddled journey can last months, as medical bills can come to the patient 30 days after the original service was rendered or even later. What's even worse is that patients are less likely to pay for services if they are asked to pay much later after the service was rendered. This is reflected in the growing \$40 billion of annual unpaid medical bills².

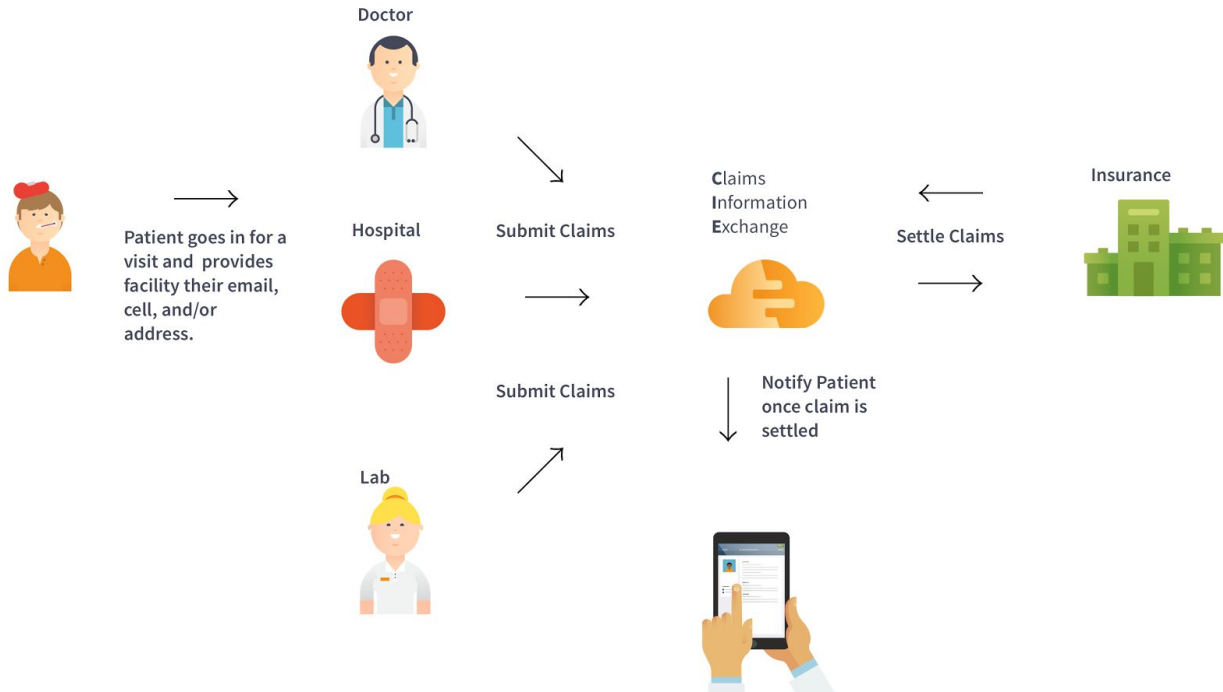
The commonality in these complaints is that different hospital providers and insurance companies do not talk to each other before communicating with the patient. Instead, they use the patient as their central place of communication. Ergo, if we can solve the root problem, we believe quite a number of the dependent consequences can be stymied as a result of the foundational change.

The solution

The solution is simple.

- Provide patients with a single, easy-to-use interface to manage and pay their medical bills.
- Provide healthcare entities and payers with a central place to securely send, access and settle medical claims.

Claims Information Exchange, CIE, is a secure, cloud-based central repository to which providers or payers can submit bills in order to provide patients with a single interface to manage and pay medical bills.



It takes advantage of the existing medical bill workflow to disrupt non-disruptively. The only difference is that instead of the insurance or the provider sending the patient the data, the data is only sent once to CIE. Our solution also evolves the use of existing data in a way that can streamline an extremely expensive process and create a data platform that other companies can plug into for further value adds. For instance, hundreds of healthcare professionals were recently arrested by the Department of Justice for false medical billing, resulting in nearly \$1 billion of medical billing fraud⁶. Once medical bills start flowing into our system, we can employ third-party companies to review medical bill errors or inconsistencies by allowing them to plug into our data platform. The opportunity to revolutionize medical bill data access is immense with a solution like CIE, especially if we can get support from governmental incentive programs, such as HHS's HITECH act in 2009, to get providers and insurers to participate⁸ in this data flow.

Technical details

Ingestion, manipulation, and presentation of data

CIE exposes an application programming interface (API) that is used by either the insurance company or the provider. As soon as details of a medical bill are available, the insurance company or the provider can either send a data payload programmatically or digitally to our API or we can download it from a secure file transfer protocol (SFTP) making it easier on the healthcare entity to participate in the CIE⁹. Upon further research, we found that EOBs are mandatory in some states so we have incorporated the option for insurance companies to attach the EOB as an addendum to a medical bill data payload. Then, after accepting or retrieving the data payload, we transform it to a format that we can manipulate and provide in our web application to the patient. We will be utilizing the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) to transform our data⁵. OMOP CDM dictates a standard for converting data coming from disparate sources to a common format that is ingestible by application and provides common schemes for data models; we build on the VISIT_OCCURRENCE table. A small snippet is below for illustrative purposes.

Field	Required	Type	Description
visit_occurrence_id	Yes	integer	Unique visit identifier
visit_cost	Yes	integer	Cost of visit
cost_covered	Yes	integer	Amount covered
cost_owed	Yes	integer	Amount owed

Once the data is available, CIE notifies the patient via text, email, or mail with a secure link where he or she can log in and manage his or her bills.

The data that we present to the patient include:

- What was done: type, facility, date, and provider of service
- Patient balance: what is owed by patient and what is covered by insurance

To cut down on the issues of jargon and understandability described in the research report, we believe these are the minimum but most important pieces of information that need to be relayed to the patient in order to qualify as a medical bill. As a customer, one looks at their bill to see how much they owe and a justification for the amount they are charged. A medical bill should be no different. But what about all the other relevant information like billing codes, service location, insurance adjustment, etc? We will still be utilizing that information behind the scenes to make our system efficient and functional but there's no need to surface this to the patient. To power functionality and high-performance, we use scalable architecture, such as a single page application frontend framework and a secure enterprise-grade backend with encrypted data stores for credit card info and medical data.

Design principles

One of the key problems we want to solve is the lack of understanding by patients of what they are paying for, a phenomenon that results in unease and distrust. Our goal for this challenge is to empower patients with a tool where they can manage their financial responsibility with confidence.

We crafted the interface using three core design principles.

- **Clarity:** enable patients to see and perform actions with confidence and make the important information easy accessible
- **Human Centricity:** eliminate the medical jargon and display the information in a way that patients can easily digest
- **Simplicity:** express information in a plain and simple manner and omit information that is nonessential to make more room for what does.

Using Colors to Convey Urgency

Color is a great way to visualize what does and does not require attention. Patients can quickly see payments that require immediate action when launching the application.

Typography to Create Visual Hierarchy

We leverage typography to better focus the user's attention and reduce confusion. The user can launch the application and immediately see his or her financial responsibility without having to read through the details. Information in large bold text is important and needs attention.

Information in smaller, light grey text is secondary information that is there in case the user needs additional detail.

Timeline Infographic

One of the major problems that patients face when receiving statements is that they aren't able to map back services rendered to them. By displaying the information in a timeline view, we are able to remind the patients when and why they came in and what services they are paying for.

Card Pattern

The card pattern is useful in grouping information in a way that mapped to the patient's mental model. Patients group services rendered to them by visit date, not by separate facilities. It also allows us to provide users minimal information upfront but still provide them the opportunity to dig deeper should they need to.

Patient engagement

Flexible payment schemes

With the adoption of CIE, we can communicate with the patients as one cohesive voice and reduce the status quo of the high volume of bills that is present in the current billing journey. However, even if we aggregate data and present it in a single outlet, getting patients to actually pay is

another problem entirely. So, we want to make it as simple as possible with the following as possible forms of payment:

- web-based with a credit card
- mobile with text payments, Venmo, or PayPal

This flexible payment feature, along with options to pay in full or in payment plans, in a single interface is where design and technology can truly make a difference in the patient's experience with medical billing¹⁰. Additional features for future consideration could be single-click payments, once the credit card or payment information is already stored, and incentives such as coupons by providers for patients who pay consistently.

Cost estimation

The research report highlighted a few more interesting concerns⁷. One is that patients do not do research on costs prior to an office visit. In order to mitigate this problem, we built a cost estimation tool into CIE tools to solve these issues. On the front page of our application, we highlight a cost estimator taking advantage of the Eligibility API¹ and a status indicator with a visual indicator of where the patient stands with each visit. With these tools, a patient can go to a visit with an estimated cost of the visit regardless of the provider or type of insurance and know where he or she stands in the process for each medical visit after the visit ends. Any time the status for a visit changes, our platform sends an alert to the patient keeping the process transparent and the patient fully aware of his or her medical landscape.

Paper

Another interesting concern in the research report is that patients actually preferred paper bills because of their "realness."⁷ We understand the true nature of healthcare and that paper is not dying anytime soon so we even build the option for patients to request a paper medical bill from our platform. Granted, it will still be one simple and cohesive document from us instead of many from both the insurance companies and the healthcare providers.

Mobile application

Lastly, we believe that the future of patient-facing materials is mobile as more and more healthcare activity is being transacted on smartphones both on the provider side and the patient side⁴. In fact, the United States Health and Human Services (HHS) is also realizing this fact and preparing for mobile tools for engaging a large population in 2017 and beyond³. That is why our platform is also available on iOS for the patient to download.

Truly transformative

To conclude, our solution is unique, creative, and truly transformative because of the following reasons:

- our central patient-facing and multiple-player-unifying architecture for medical bill payments is one that is non-existent today
- our application, available in web and mobile formats, meets modern consumer expectations with its simplicity, beauty, and clarity; these qualities do not underpin any of the legacy enterprise software that has been incumbent in the insurance and healthcare industries for the last few decades
- our patient-engagement tools such as flexible payments coupled with coupons, cost estimation and status reports are integrated into our application; typically, each insurance company has its own cost estimation tool in a hard-to-find website

With technical, design, and healthcare backgrounds, we have a strong team ready to execute and we strongly assert that having a single source to which all medical bills flow is critical for addressing systemic process disadvantages that exist within the current fragmented network.

User feedback

Some of the feedback we have received from real patients (age ranges 24 - 70) with whom we user-tested our design:

“I have chronic back pain and receive medical bills from numerous facilities throughout the year. However, when I recently moved, I missed a medical bill payment because the facility claimed they sent me a letter even though I never received it at my new address. Something like the CIE would be an immense simplification for me to receive all my bills in one place, especially with your design. I’ve never seen something this beautiful in any of my experiences with healthcare software.”

-A Patient

—

“Gorgeous and useful! Sign me up!”

-A Patient

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“This is the 21st century where we can cure crippling diseases, build fully electric cars, and make international financial transactions with a tap on a smartphone. But, we can’t store some medical bill data in one place? It’s embarrassing how backward the healthcare industry is. That said, we should have had something like the CIE years ago. However, I think the way you’ve created this for the patient is great as the visual is appealing to the eye and looks like a lot of modern consumer applications on the market today.”

-A Patient

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“The CIE is a fantastic idea. But, what’s more amazing is the platform you will create with the CIE, which will allow for all sorts of interesting applications: big data analytics on huge claims datasets, the patient engagement tools you’ve already thought of, and more. I think after enough people use your platform and there is a critical mass, you will have the largest database of medical bill data in the country and that is game-changing.”

-A Medical Professional

“A sexy design in an unsexy industry.” -

-A Medical Professional

References

1. <https://eligible.com/docs/cost-estimate-overview>
2. <http://www.forbes.com/sites/brucejapsen/2013/01/07/unpaid-hospital-bills-rise-to-41-billion-annually/#716ead6519ea>
3. <http://www.modernhealthcare.com/article/20141129/MAGAZINE/311299980>
4. <http://www.healthdatamanagement.com/news/is-healthcares-future-going-mobile>
5. <http://www.ohdsi.org/data-standardization/>
6. <http://www.cnn.com/2016/06/23/health/health-care-fraud-takedown/>
7. Mad Pow Research Report
8. The Innovator’s Prescription by Clayton Christensen
9. The Trillion Dollar Prize by Tom Latkovic
10. <https://www.linkedin.com/pulse/building-big-health-tech-company-malay-gandhi?trk=prof-post>