**TITLE PAGE**

**Title of project:**

Implementation of Health Information Exchange (HIE) at the Pima County Adult Detention Complex (PCADC): Lessons Learned

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**ABSTRACT**

**Specific Aims:** To evaluate the successes and failures of the recent implementation of the Arizona Health-e Connection (AzHeC) health information exchange (HIE) at the Pima County Adult Detention Center (PCADC); to identify a generalized infrastructure and draft recommendations for implementing HIE at other correctional facilities.

**Methods:** Participants pertinent to the implementation by current staff at the PCADC were identified through snowball sampling. Interviews were conducted in-person or by telephone using a semi-structured interview guide. Demographics regarding roles and responsibilities during implementation were collected during each interview. Participants were asked for input regarding key aspects and lessons learned from the implementation. Interviews were audio-recorded, transcribed verbatim, and then analyzed with Atlas.ti software for common themes.

**Main Results:** A total of 12 individuals were interviewed, providing a comprehensive set of perspectives. Six common themes were identified: impact of being a novel implementer; challenges surrounding implementation; problems during implementation; what was done well; benefits of the system; and communication during implementation. Potential barriers that were successfully anticipated were establishing the value of the HIE through pilot studies to obtain early stakeholder buy-in, and addressing legal/privacy issues for the at-risk population in the corrections system. Problems that arose during implementation often involved information technology issues.

**Conclusions:** Despite challenges faced throughout the HIE implementation, improvements in patient care, workflow, and timesavings made a tremendous impact for those involved. The lessons learned and advice given by the participants of this study can provide guidance for other correctional health systems wishing to implement a HIE at their facility.

**INTRODUCTION**

Health information exchange (HIE) is a system that allows healthcare professionals to access and share patient information electronically in a secure manner.[1] The implementation of such a system has the potential to improve patient care tremendously. Traditionally, medical information is shared between providers via fax, telephone, or is provided by patients.[1-3] With HIE, a patient's medical information can be accessed almost immediately and quality care can be provided efficiently, safely, and appropriately.[1,3]

The healthcare provided through the criminal justice system is separate from the care a patient receives in the community, which can lead to disjointed and costly care.[3] The health information collected in correctional facilities is largely self-reported by patients and cannot be readily verified. Patient self-reporting is not always reliable and can lead to medical errors not only in the correctional facility, but also in the community following release because community providers may be unaware of treatments their patients received while incarcerated.[3] If HIE were implemented in all of the 3,300 jails in the United States, accurate information would be obtained and quality care could be given to a population known to have higher-than-average rates of chronic diseases, substance addiction and mental illnesses.[2,3] Effectively treating this patient population could aid in preventing re-incarceration, which would lower overall costs to the criminal justice system and to society.

There are very few correctional facilities that have implemented HIE, despite the evidence of its benefit. This could be due to the lack of information available regarding existing HIE systems in correctional facilities and insufficient information published on implementation lessons learned. The Pima County Adult Detention Center (PCADC) in Arizona has successfully implemented a HIE system (Arizona Health-e Connection, or AzHeC), which could serve as a model for others. Currently, "The Network" is the HIE that is operated by AzHeC, following a recent affiliation between AzHeC and the Health Information Network of Arizona (HINAz). At this time, there are 105 assorted healthcare providers or organizations that participate in the HIE in Arizona, working with information that encompasses 5.9 million unique patients.[4] In order to comply with federal legislation regarding the privacy and protection of patient information in the HIE, Arizona House Bill 2620 was enacted in 2011 (Figure 1), which established an opt-out process with regards to the sharing of patient information on The Network.[5] Under this bill, patients have the rights to: 1) opt-out of having their information shared through The Network; 2) change their mind about their opt-out status;

and 3) opt-out of having a particular healthcare provider share their information through The Network. Participants in The Network must honor opt-out requests until a patient or a party authorized to make decisions on the patient's behalf requests to reverse their opt-out decision.

This study was designed to provide a retrospective review of the PCADC implementation of AzHeC. A thorough literature search has shown that such an evaluation has not been published for the use of HIE at correctional facilities. This study evaluated the implementation process by interviewing key players involved with the PCADC HIE implementation. As such, the purpose of this process evaluation is to assess the successes and failures of implementing HIE into the existing PCADC healthcare infrastructure.

**METHODS**

Design: This was a retrospective, qualitative review of the adoption of AzHeC, a HIE system, at PCADC. This study was approved by the University of Arizona Human Subjects Protection Program.

Subjects: Individuals were invited to participate in this study via email if they were identified as integral to the implementation process by current or previous PCADC staff (i.e. snowball sampling) during interviews.

Measures: Participant feedback was gathered using semi-structured interview guides with open-ended questions during each interview. The semi-structured interview guide was adapted from similar process evaluations conducted by Sicotte and Pare, Takian and colleagues, and Belden and Proeschold-Bell.[6-8] Participants were asked to provide insight regarding problems that arose during the implementation process and how they were handled, how the adoption could have been different, and what aspects of the adoption went smoothly or were considered successful. Demographics were gathered on participant roles and responsibilities during the implementation in order to ensure a comprehensive sample of different perspectives.

Data Collection: Interviews were conducted over a period of 6 months, either in-person or by phone after written or verbal consent was obtained from each participant. Each interview lasted between 15 and 60 minutes, and was audio-recorded and transcribed verbatim. Typed transcripts were de-identified to protect participant confidentiality and anonymity.

Data Analysis: The sample size was dependent upon the number of individuals identified and their

availability during the study period. A set of predetermined codes for qualitative analysis was established to reflect the semi-structured guides used during interviews, with additional complementary codes added empirically during data analysis (Appendices: Atlas.ti Data Code Book). Transcripts were then independently coded by two different investigators; subsequent discussion of coding resulted in consensus between the investigators for all transcripts. Transcripts were coded using Atlas.ti qualitative analysis software, version 7.5.10. Participants were grouped by role during HIE implementation, as well as by site of employment. Then, a code frequency analysis was run for individual participants and for each designated group (Tables 2-4). Quotation reports for each individual code were also extracted.

## RESULTS

### Executive Summary

A total of 17 individuals identified from initial or snowball sampling were invited to participate, of which 12 responded and were interviewed, for an overall response rate of 70.6% (12 of 17). A wide variety of implementation perspectives were sampled based on the 12 participants interviewed, excepting administrative stakeholders and the contracted healthcare provider for the PCADC (Table 1). Two interviewed participants were not involved in the original HIE implementation, and were therefore excluded from data analysis data analysis. However, these two individuals were privy to information from the original HIE implementation and will have a role in the re-implementation of AzHeC (the system has gone offline for reasons beyond the scope of this project). Nonetheless, several of their responses were deemed valuable to the understanding of AzHeC at the PCADC and were included where appropriate. Based on overall frequency data, six main themes were identified and reported in detail (Table 2):

1. Impact of being a novel implementer of HIE in Arizona and in correctional systems (positive and negative)
2. Challenges surrounding implementation
3. Problems that arose during implementation
4. What was done well during the implementation
5. Positive outcomes/benefits of HIE at PCADC
6. Communication and transparency during the implementation

The frequencies of these themes are reported according to two classification schemes: site of employment (Table 3) and participant role during implementation (Table 4). Other less frequent themes containing nonetheless relevant insight were also summarized. In addition, each participant (including the two who were not involved in the original HIE implementation) had advice to share and opinions on what could have been done differently in regards to implementing a HIE system. An overview of this information is provided to aide other correctional facilities in the implementation of HIE. A review of themes and representative quotes are detailed below.

**Theme 1: Impact of being a novel implementer of HIE in Arizona and in correctional health systems**

Of the 10 participants, six commented on the impact of being a novel implementer of HIE in Arizona and in correctional health systems (Tables 2-4). Overall, participants indicated that being a novel implementer of the HIE was challenging for several reasons. The lack of information available to the implementation team on implementing such a system in the correctional setting made it difficult to get all parties involved this endeavor right away:

> *"I think it made it more difficult...people did not understand what we were trying to do."*

This lack of information also made it difficult for the implementation team in regards to the overall set-up and maintenance of such a system, because they were learning as they went along in the process:

> *"I think that the downside of being the first one is that you learn from your own mistakes and you're not learning from what others had gone through and there wasn't really anybody else to collaborate with in terms of what worked well and what didn't."*

PCADC made a lot of changes in order to implement the HIE at their facility. One of the most significant changes was switching from paper records to an electronic medical record (EMR). After the HIE went online, the users had to follow the new workflow utilizing both the EMR and HIE:

*"...nobody really had an idea of how to incorporate all of that digital information coming into the system and how to dump it into an electronic medical record."*

Another challenge that resulted from being a novel implementer was the lack of information available in the system to query:

*"So I would say that weakness that we found is that we at Pima County implemented this very early and so there had not been a lot of buy-in from other hospitals, from other providers, so all of that information would not be in there."*

Though the impact of being a novel implementer made for a challenging experience for all involved, participants described PCADC's implementation as exciting, saying they took pride in being the first group to implement a HIE. Having the opportunity to be involved in something that would improve continuity of care and set an example for other facilities in the future helped maintain motivation and morale. Representative quotations are included below:

*"It was very exciting, it was a great opportunity for that coordination of care that really hadn't been there before."*

*"I think it made it easier, you know we took a lot of pride in the fact that here we were setting the trend for the future."*

*"I would share the pride of doing it first...you would be setting the precedent and you could really advocate for the continuity of the medical treatment being given to the people who have been incarcerated."*

**Theme 2: Challenges surrounding implementation**

There were a multitude of challenges surrounding the implementation of the HIE that participants shared

during their interviews (Tables 2-4). These are the challenges that the implementation team had to address up until the HIE went online and some even persisted past that time. In order to move forward with this project at PCADC, the implementation team had to garner as much interest and support as they could, starting with Pima County:

> *"...the first phase [was] engaging the government."*

As stated above, PCADC did not have an EMR when they first approached the idea of implementing a HIE, so they had limited necessary resources available to them, such as computers:

> *"...there was no health record in the jail [at that time]...there were very few computers...so if you wanted to have access to a health information exchange that was computer-based, you had to have computers."*

This was resolved through the adoption of an EMR at the facility prior to the implementation of the HIE, after which the workflow had to be reconfigured to include both the EMR and HIE.

According to one participant, the amount of people involved in the project was a challenge in its own. Everyone had their own idea of what they wanted out of the HIE and how they wanted it to work; as such, it hindered the forward motion of implementation:

> *"Seemed like there was a lot of people who were involved. So from my perspective it was easy for the group to kind of lose focus as to what the core project was."*

Challenges that proved to be even more difficult included:

- Legal and consent issues, such as whether or not incarcerated patients would be able to opt out of the system so their information couldn't be obtained or shared

> *"There was still a lot of discussion...in terms of consent and whether that was going to apply to people*

*who were being detained."*

- Determining access (e.g.. who has access) and establishing policies regarding that access (e.g. how to determine if a user is authorized and what information they are authorized to view)

  *"...we [had] to tie up the policies to safeguard the privacy of those people who are under our care...like the adoption of the policies that would provide control on what's being given and who has access to it."*

- Incomplete/missing data in system (e.g. not a lot of information available, not taking into account possible aliases of a person, etc.)

  *"When we went live we were the only people in the state using it...and we knew there wasn't going to be a lot of information in there."*

  *"...to make sure that the information that you had access to was the right person who you were actually engaging with was a bit of a challenge in that environment. People use pseudonyms, they steal insurance cards, and everything in between. There are people in the system that had like ten different names."*

**Theme 3: Problems that arose during implementation**

The most common problems reported by participants revolved around vendor communication and system issues (Tables 2-4):

*"It seemed like every time we turned around there was a technological issue."*

With regards to communication, participants felt that there were times that the vendor for the HIE was not as available or responsive as they should have been, especially in light of some of the system issues that occurred during and after the implementation.

Specifically, participants recounted a variety of information technology (IT) concerns that included:

- Internet/connectivity problems

  *"...if you're doing something that's fundamentally based on an internet connection and connections are not good...then you drop your accessibility...in those days internet connections were not very stable."*

- User/accessibility issues

  *"...a few staff...were not able to get into the system after the training."*

  *"...it never met our functional needs...so the only information we as the medical entity could actually access was current medications that they [detainees] were on."*

- System query limitations

  *"...to build a system that would be able to take into account all the registered aliases of a person, was a more complicated and complex algorithm than AMIE (Arizona Medical Information Exchange) had originally been built to run on."*

  *"...when it first started coming in, one of the big problems was that it would give you medications for the past 23 years…[you] had to painstakingly take time to look through and see where they got it in the last 30 days."*

- Reciprocity limitations

  *"They were what we would call a taker...so they didn't give any of that information of what happened in the detention center back out to the system."*

Beyond these information technology issues, overall, the participants felt that the majority of problems (legal, workflow, etc.) had been well anticipated and addressed prior to the system going online.

**Theme 4: What was done well during the implementation**

A common theme that arose without direct questioning was the successes of the implementation, and what participants felt had been handled well during the process (Tables 2-4). These successes occurred throughout the process, such as:

- Educating and obtaining stakeholder buy-in through the evaluation of two pilot studies regarding the value of AzHeC in Phoenix and at the PCADC

  *"...there was a recognized need at the provider level...it seemed like a good way to avoid risk and to better serve the community."*

  *"So it was the fact that we were able to show what the medication history did that helped get buy-in...especially...when it went live in Pima."*

- Addressing potential privacy concerns through the appropriate legal channels in order to exclude detainees from the opt-out requirements that apply to the greater population in Arizona

  *"[One of the implementation team] worked very hard at getting...the corrections population excluded from requirements for consent."*

- Having the right, highly motivated people involved in the implementation, including a 'champion' who was able to advocate from a corrections system point of view to stakeholders and non-corrections personnel

  *"I think we had the right people at the table and I think that is key...if we didn't have the higher echelon of decision makers at the table it would never have happened."*

*"We met a lot of motivated people along the way who wanted to improve systems and do that extra work."*

- Anticipating the need to have an electronic medical record system at PCADC prior to bringing the HIE online

*"…we knew that had to happen before we could do anything with HIE, and so that was a decision that was made that was monumental."*

- Maintaining constant and valuable communication during the implementation

*"…everybody shared responsibility and knew what each other were doing."*

*"We developed our own training curriculum in addition to the training the HIE offered…it was very methodically created and included the people that would actually have to use it."*

- Motivating the implementation team to keep up morale and work ethic in spite of setbacks

*"So I think you got to have a strong personality like that on your team because I do think there are a lot of people who would just say 'you know, this is just not as easy as we thought it would be,' and so I think projects sometimes do fall because of that."*

**Theme 5: Positive outcomes/benefits of HIE at PCADC**

The most commonly reported positive outcomes from the implementation of the HIE include (Tables 2-4):

- Less man hours/research hours trying to find where the detainee gets their prescriptions filled and what medications they are taking.

*"Getting rid of the calls between the pharmacies and having everything condensed into one easy platform that people can access was very nice."*

- Improved workflow

*"...having access to actual real information and not having to rely on the patient is extremely useful."*

*"I think for the treating providers in the detention center it provided a great benefit. It gave them information that they otherwise would not have had, or would have gone to great lengths to obtain."*

- Improved patient care by identifying both legitimate patterns of drug use, which allowed the patient to receive treatment quicker. Also, manipulation by the detainees could be avoid through verification of self-reported drug use.

*"... [it] sped up the time where the patient would actually get their medication."*

- Provided a safety aspect for the jail staff because the detainees needs were being met quicker, so they were less agitated

**Theme 6: Communication and transparency during the implementation**

The parties most often involved during meetings were the AZ Department of Corrections, the AzHeC Board of Directors, the HIE vendor (then Optum), the Pima County Sheriff's Department (health division), the contracted healthcare provider (then Conmed), and the other members of the implementation team. On-site users and healthcare practitioners were included in early meetings to identify what they needed from the HIE in order to improve patient care at booking. Meetings that included the major stakeholders were held on a weekly to monthly basis, while the primary implementation team met daily to weekly as needed. The IT team

also met on a weekly to biweekly basis. Participants who were members of the implementation team were more likely to report that communication was sufficient (Tables 2-4):

> *"We met regularly, sometimes weekly, sometimes daily, to make sure that during implementation everybody was comfortable and felt trained."*

> *"It was always happening."*

Conversely, other on-site personnel and end users who were not included in meetings were more likely to report that communication was insufficient and overly exclusive (Tables 2-4):

> *"But when you came down to the ground level - kind of the boots on the ground people that were working in the system - I don't know that there was forum for that."*

> *"I think that it probably could have had more of a core staff of personnel from all entities that met regularly throughout...to address issues."*

> *"You know there was…no communication down to that level. It was just instructed out that we were going to make this change…so we just went along with it and maintained as best we could."*

**Other less frequent themes**

*Perception of HIE growth (statewide)*

In general, participants felt that the continued growth of HIE in Arizona is in the best interest for all parties involved, both within and outside of the correctional system (Tables 2-4).

> *"I'd like to see all of the jails in Arizona get on it because I think that it could help."*

> *"I'd like to see in Arizona, especially in the corrections institutions, be upgraded so that when patients are moved out of a jail setting and wind up in a prison setting that that information...that we performed*

*here at the jail will just follow that person right into the prison setting."*

Some participants were optimistic about this potential growth:

*"I only foresee it being something...that is going to really enhance how we deliver healthcare across the continuum."*

Others were more skeptical:

*"...even after these years, we're still in quite a primitive place and to my knowledge, the way that we had envisioned having information on individuals in the correction system available throughout the state is nowhere close."*

Still others were pragmatic about it:

*"At a larger level, the state [Medicaid] is kind of pushing all the other correctional facilities this direction, so hopefully we'll have HIE's in with Arizona Department of Corrections."*

*Value of the HIE*

From a subjective approach, participants overwhelmingly felt that the HIE has provided value to the facility and to patient care:

*"Yeah, absolutely I think it's very useful...to be able to go out and draw that information out and see exactly what their history is and see what their medication list actually is, is extremely useful for us."*
*"This is something that really is necessary to improve care, to improve continuity, and to lower costs."*
*"...this is probably one of the best things that I've seen in medicine being a nurse for 25 years."*

*HIE software, system use, and training*

As mentioned previously, many participants felt that there were multiple information technology (IT) issues that arose during implementation. Conversely, however, they also reported that the HIE was very user friendly in its design:

*"Using the system was not very hard."*

*"It was pretty straightforward. It was an easy system to actually log into and to put in information."*

This might be attributed to the training process, which included both online training modules as well as trained, on-site super users:

*"So they had to train all of the intake personnel at the jail so that they knew how to look at the information, how to access it, and then how to move it from the HIE into the medical record."*

*"We developed our own training curriculum in addition to the training the HIE offered...it was very methodically created and included the people that would actually have to use it."*

**Advice for implementation of HIE at other correctional facilities**

Participants provided a wide range of responses when asked to provide advice for others who might want to implement HIE at their facilities in the future:

- Conduct pilot studies in order to establish the value of HIE at a given site and assist with stakeholder buy-in

*"I really think...the best thing was when we did that pilot...so that organizations...could realize the benefit."*

*"You certainly need the collaboration of all the agencies that are going to be involved."*

- Maintain adequate communication and have the right implementation personnel involved

  *"...keep the communication up because we couldn't have done it without that."*

  *"...the jail and prisons ought to be represented [on stakeholder boards]."*

- Ensure IT and end user involvement during the implementation process

  *"...the smartest thing you could do is have super users at each site."*

  *"[Have] closer communication with the people who [are] actually doing the technical part of it."*

- Anticipate privacy and security/accessibility issues that can cause barriers to implementation

  *"Had there been a higher level of biometric security that was available...that would've made it easier to be accepted."*

- Be sure to have a strong leader who can help maintain morale and motivation

  *"You do need a champion."*

  *"If you're committed to making the vehicle start, you must be committed on how to keep it running. It's not just enough that we make the vehicle start, but we have to be committed on how to make it reach its destination."*

**DISCUSSION**

Overall, those who were involved in the implementation process felt that it went more smoothly than

anticipated, in spite of the challenges they faced as novel users of AzHeC in Arizona. In fact, most felt that they had successfully anticipated those challenges and had established solutions early in the process, which helped the implementation go more smoothly later in the process. The majority of participants advocated communication and early stakeholder involvement as the two elements that are most needed for a successful implementation. The latter can be accomplished with the use of early pilot studies and stakeholder education to establish the expected value of having HIE at a particular site. Ongoing awareness about the vulnerability of the patient population in the corrections system was another challenge unique to this implementation that participants felt was handled well. The early lobbying and effort to have legislation adopted that addressed the security and privacy issues for detainees ensured that the system could be accessed and used in a way that improved patient care in this setting. Beyond these early challenges, the majority of problems that arose revolved around information technology and system use issues, which were largely handled by on-site personnel and through communication with the HIE vendor.

Based on a thorough review of the literature, this is the first study of its kind to evaluate the implementation of HIE at a correctional facility. Moreover, the novel adoption of HIE at PCADC on a statewide level precludes any other studies about its use in Arizona.

Due to the nature of this retrospective process evaluation, data and subsequent analysis were dependent upon participant responsiveness. As a result, certain perspectives could not be included due to a lack of response, such as administrative stakeholder and corrections healthcare provider. This voluntary sampling also resulted in a small sample size, as well as the potential for selection bias due to the non-random selection of participants. With regards to the interview process, interview time was limited to 30-60 minutes in order to avoid burdening participants and improve participation rates. Thus, not all questions on the semi-structured interview guide could be addressed during all interviews. Further insight might have also been missed when participant schedules created the need for even more abbreviated interviews. The retrospective nature of this project further introduced the possibility of recall bias in participant responses. The HIE was brought online at PCADC several years ago, and the implementation process took several years before that, such that participant recall may be less than optimal. Lastly, since the implementation at PCADC involves a very unique patient population in the corrections system, the generalizability of certain issues identified during the study may be limited (e.g. patient consent processes).

**CONCLUSIONS**

The participants of this study all advocated for the implementation of HIE in the correctional health setting, despite the challenges they faced throughout the implementation at PCADC. The improvements in patient care, workflow, and time savings made a tremendous impact for those involved at PCADC and these continue to drive the HIE initiative at their facility. Due to the inaccuracy of self-reported medical history by those being incarcerated, appropriate treatment can be delayed for long periods of time. As the healthcare of these individuals is the responsibility of the county facility in which they are being detained, a system that gives real time medical information provides its users a monumental advantage. The lessons learned and advice given by the participants of this study can act as an aid for other correctional health systems wishing to implement a HIE at their facility.

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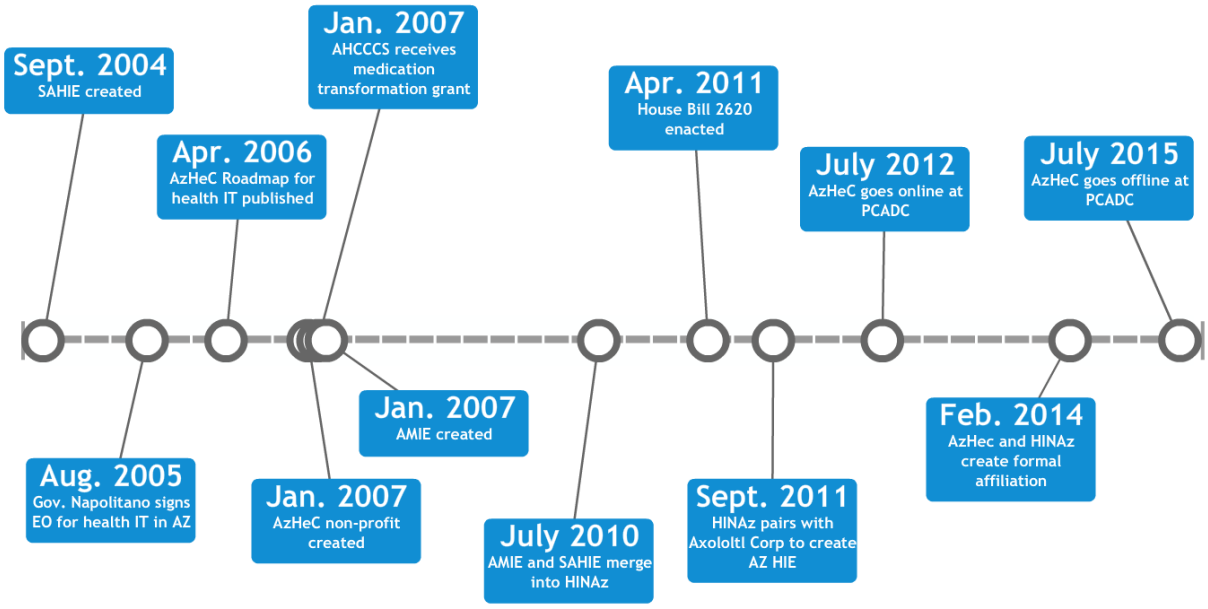
**TABLES AND FIGURES**

Figure 1: Timeline of HIE in Arizona and at PCADC




Legend: SAHIE = Southern Arizona Health Information Exchange; AzHeC = Arizona Health-e Connection; IT = Information Technology; AHCCCS = Arizona Health Care Cost Containment System; AMIE = Arizona Medical Information Exchange; HINAz = Health Information Network of Arizona; PCADC = Pima County Adult Detention Center

Table 1: Characteristics of Study Participants (n=12)

| **Site of Employment** | **Role During Implementation**[1] | **Number of Participants (n=12)** |
|---|---|---|
| Jail/Site (PCADC) | User[2] | 2 |
| | Other on-site personnel | 3 |
| Government (Pima County) | Implementation Team[3] | 5 |
| HIE (AzHeC) | Information Technology | 1 |
| | Implementation Team | 1 |

[1]There were no stakeholders interviewed for this study.
[2]One participant was not involved in the original HIE implementation, but will be an end user of the re-implemented HIE.
[3]One participant was not involved in the original HIE implementation, but is actively involved in the re-implementation of AzHeC.
Legend: PCADC = Pima County Adult Detention Center; HIE = Health Information Exchange; AzHeC = Arizona Health-e Connection

Table 2: Overall Frequencies of Themes Identified Through Participant Interviews (n=10)

**Percentage of participants who talked about each

| Code/Theme | | % Participants (n=10)[1] | Total Frequency Mentioned |
|---|---|---|---|
| Impact of being a novel implementer of HIE in Arizona and in correctional health systems | Negative | 50% (5/10) | 12 |
| | Positive | 30% (3/10) | 4 |
| Challenges surrounding implementation | | 80% (8/10) | 22 |
| Problems that arose during implementation | | 90% (9/10) | 28 |
| What was done well during the implementation | | 70% (7/10) | 28 |
| Positive outcomes/benefits of HIE at PCADC* | | 60% (6/10) | 12 |
| Communication and transparency during the implementation | Insufficient | 30% (3/10) | 4 |
| | Sufficient | 70% (7/10) | 9 |

[1]Only 10 of 12 participants are included in the analysis; two participants were not involved in the original HIE implementation and responses are reported elsewhere as noted.
Legend: HIE = Health Information Exchange; PCADC = Pima County Adult Detention Center

Table 3: Frequencies of Themes by Site of Employment (n=10)

**Total number of times mentioned

| Code/Theme | | HIE (AzHeC) | Jail/Site (PCADC) | Government (Pima County) | Total |
|---|---|---|---|---|---|
| Impact of being a novel implementer of HIE in Arizona and in correctional health systems | Negative | 1 | 2 | 9 | 12 |
| | Positive | 0 | 2 | 2 | 4 |
| Challenges surrounding implementation | | 9 | 2 | 11 | 22 |
| Problems that arose during implementation | | 5 | 9 | 14 | 28 |
| What was done well during the implementation | | 5 | 1 | 22 | 28 |
| Positive outcomes/benefits of HIE at PCADC[1] | | 0 | 8 | 4 | 12 |
| Communication and transparency during the implementation | Insufficient | 0 | 3 | 1 | 4 |
| | Sufficient | 1 | 2 | 6 | 9 |

[1]No negative outcomes were reported by the participants.
Legend: HIE = Health Information Exchange; PCADC = Pima County Adult Detention Center; AzHeC = Arizona Health-e Connection

Table 4: Frequencies of Themes by Role During Implementation (n=10)

**Total number of times mentioned

| Code/Theme[1] | | Implementation Team | User | Other On-Site Personnel | Information Technology Team | Total |
|---|---|---|---|---|---|---|
| Impact of being a novel implementer of HIE in Arizona and in correctional health systems | Negative | 10 | 2 | 0 | 0 | 12 |
| | Positive | 2 | 1 | 1 | 0 | 4 |
| Challenges surrounding implementation | | 19 | 0 | 2 | 1 | 22 |
| Problems that arose during implementation | | 18 | 6 | 3 | 1 | 28 |
| What was done well during the implementation | | 24 | 1 | 0 | 3 | 28 |
| Positive outcomes/benefits of HIE at PCADC[2] | | 4 | 2 | 6 | 0 | 12 |
| Communication and transparency during the implementation | Insufficient | 1 | 2 | 1 | 0 | 4 |
| | Sufficient | 6 | 0 | 2 | 1 | 9 |

[1]No stakeholders were interviewed.
[2]No negative outcomes were reported by the participants.
Legend: HIE = Health Information Exchange; PCADC = Pima County Adult Detention Center

**APPENDICES**

**Semi-Structured Interview Guide**

***Demographics***

What is your current title at the PCADC? What was your role/title during the HIE implementation?

How long have you been working with/at the PCADC? If you've now left, how long were you at the PCADC?

How long or how much time did you spend on the HIE adoption?

***Stakeholders***

**Implementation**

- Responsibilities during implementation
- Challenges faced concerning the development and implementation of EHR software
- How many times/often did you run system checks/tests?
- On average, how long did it take to resolve an issue?
- Strengths and weaknesses of HIE software

**Perceptions**

- Issues/difficulties faced from the adoption of HIE software?
- How did being the first to implement the Arizona Health-e Connection system impact its adoption?
- How was communication between stakeholders and those involved in the process?
- What lessons can be applied to future implementation sites/practices?

***Implementation Team***

**Implementation/Adoption**:

- What started the adoption process? Why did you want to adopt it? What was the end goal?
- Who was involved in implementation (groups and people)
- What was the decision process? How were decisions made?
- Who was involved in making decisions?
- How were decisions implemented?
- When were major decisions made - create a timeline
- Resources used (human resources, financial)
- What problems arose? How were they handled?

- What could have been done differently to manage problems?
- How did you collaborate and maintain transparency across all parties involved?
- What about being an early adopter made the process more difficult? Easier?

**How do you feel the system has impacted:**

- Quality of Healthcare
- Healthcare professionals
- Local Community

**Perceptions**

- Where do you see the system going in Arizona? The country?
- What would you do differently?
- Was it necessary?
- Was it worth it?
- Benefits realized so far

***Info Technology Team***

**Implementation**

- Training provided and ongoing support
    - Who and how
    - What is the PCADC's strategy for new staff?
- Collaboration within the organization
    - What problems arose?
    - What problems are ongoing or new?
    - How were problems managed?
    - What could have been done differently to manage problems?
    - How did you collaborate and maintain transparency across all parties involved?
    - What might be done differently?

***Users***

**Use of the software**:

- How the interviewee uses the system

- Changes in the way you use the system since adoption
- Training received and ongoing support
- User-friendly system?
    - If not, how much do tech skills matter?
- Frequency of use
    - Usage/access rates
- Initial, current and ongoing problems and concerns
- Changes that the user would like to see happening in the system
- Accessing the system? Issues, ease?

**How do you feel the system has impacted:**

- Quality of Healthcare
- Healthcare professionals/users
- Local Community

**Perceptions**

- How could the adoption have been improved or easier for you?
- Was it necessary?
- Was it worth it?
- Benefits realized so far

**Data Codebook**

atlas.ti report

Number of Codes: 44

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| **Advice for future teams** |
| **Challenges surrounding implementation** |
| **Communication-insufficient** |
| **Communication-process of** |
| **Communication-sufficient** |
| **Decisions-how they were implemented** |
| **Decisions-how they were made** |
| **Decisions-what types were there** |
| **Decisions-when were they made** |
| **Decisions-who made them** |
| **Demographics: current role/title** |
| **Demographics: length of time at PCADC** |
| **Demographics: role/title during HIE implementation** |
| **Demographics: time spent on HIE adoption** |
| **HIE software-strengths** |
| **HIE software-weaknesses** |
| **Impact of pioneering the HIE-negative** |
| **Impact of pioneering the HIE-positive** |
| **Implementation-Goal of HIE** |

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| **Implementation-parties involved** |
| **Implementation-reasons to adopt HIE** |
| **Opinion-necessary** |
| **Opinion-what could have been done differently** |
| **Opinion-worthwhile** |
| **Outcome of implementing HIE-negative** |
| **Outcome of implementing HIE-positive** |
| **Perception of growth-country wide** |
| **Perception of growth-locally** |
| **Perception of growth-statewide** |
| **Problems-arose during implementation** |
| **Problems-management** |
| **Problems-new** |
| **Problems-ongoing** |
| **Resources-financial** |
| **Resources-human** |
| **Training-how provided** |
| **Training-who provided** |
| **Training-who received** |
| **Usage-change in the way the system was used** |
| **Usage-difficult** |
| **Usage-how frequently used** |

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|---|
| **Usage-how the system is used** |
| **Usage-user friendly** |
| **What was done well** |