PROJECT MISSION

Our mission is to develop and implement tools that will provide greater transparency and accountability for Federal partners and taxpayers alike while improving our collective understanding of the issues surrounding homelessness.

APPROACH: DISTRIBUTED REPORTING AND DATA WAREHOUSING

The *Opening Doors Federal Strategic Plan to Prevent and End Homelessness* stipulates the need to "create a common data standard and uniform performance measures if feasible" and to "encourage the dynamic use of state and local data warehouses." The distributed warehouse model allows for one application to be built that can be openly shared for all to benefit from. With the traditional data warehouse model there is often privacy concerns related to having all data posted to a central "big brother" server. The distributed data warehouse (DDW) model addresses these concerns as the data can remain under local control.

To accomplish this feat a master version of the warehouse is created and replicated so that it can be hosted anywhere. Domestic violence programs and those without Internet connectivity can host such an environment within the confines of their local network. States, regions, and agencies can have independent instances of the warehouse running either locally, in a data center, or in the cloud.

The DDW framework relies on common data exchange standards and distributed reporting tools in order to create uniform outputs from consistent data inputs. The *ESG CAPER* and the *APR Generation Tool* are two such distributed reporting tools that have been proven to be accurate through an intensive process of peer review conducted by the national HMIS Vendor Test Lab, *The Partnership Center*. The DDWs leverage these existing Excel based reporting tools to help fulfill mandatory reporting requirements. Similar such tools exist for the *Annual Homelessness Assessment Report (AHAR)* and the annual *Point In Time Count.*

The DDWs are also capable of supporting the goal within the Opening Doors plan to create uniform performance measures. Details on how these reporting tools are currently being put into practice can be found within the "*Housing Prioritization Tools and the Proposed Chronic Homeless Definition*" white paper.

VIRTUES OF DISTRIBUTED DATA WAREHOUSING

Reduced Implementation and Operating Costs

A typical data warehouse relies upon expensive "server side" requirements of hardware and software in order to run. The DDW approach does not require proprietary software licenses and the hosting options are varied. If a region has already made the investment in servers the DDWs can run on these.

If not, the DDWs can also run on the cloud and with the cloud there are no upfront hardware or software costs. The pricing for cloud based hosting models is based on storage and utilization which can fluctuate day by day. With dedicated hosting environments there is often a need to pay for extra capacity in anticipation of a potential future need but this is not the case with cloud-based hosting.

Ease of Implementation

A typical data warehouse environment requires significant upfront investment of both time and capital in order to deploy. DDWs on the other hand are basically clones of a master copy where this investment has already been made. If a state or CoC needs a data warehouse then they would simply be provided instructions on how to download and install the DDW.

Real-Time Information and Results Polling

Isolated data warehouse nodes can be set up per state or CoC outside of HUD's internal infrastructure. This allows for the data collection and reporting to occur within the confines of the local region. If HUD or other Federal agencies have a question that needs to be answered the query logic and the query parameters can be sent to these varied reporting nodes and the results of these queries can be sent back "over the wall".

Historical Reporting

The current approach for reporting only allows for results to be gathered on a particular area from the current date forward. For example, the 2013 Point in Time included a new count of the total number of homeless female veterans in each community. With DDW however, a reporting query could be run over data from prior years and the results could be sent back to the polling agency.

Reporting According to the Geographic Boundaries of the Federal Partner

HUD, VA and SAMHSA have their own reporting regions, communities have census tracts and schools districts, and CoCs can cover multiple municipalities. In-line support for the *HUD Region Designation Web Service* enables reporting to occur according to the geographic regions of each Federal partner.

GIS Mapping

Mapping is an essential tool to ensure community resources are placed in areas where they are most needed. GIS is also the underpinning for an effective Information and Referral framework that takes both proximity and transportation limitations into consideration.

Disaster Recovery

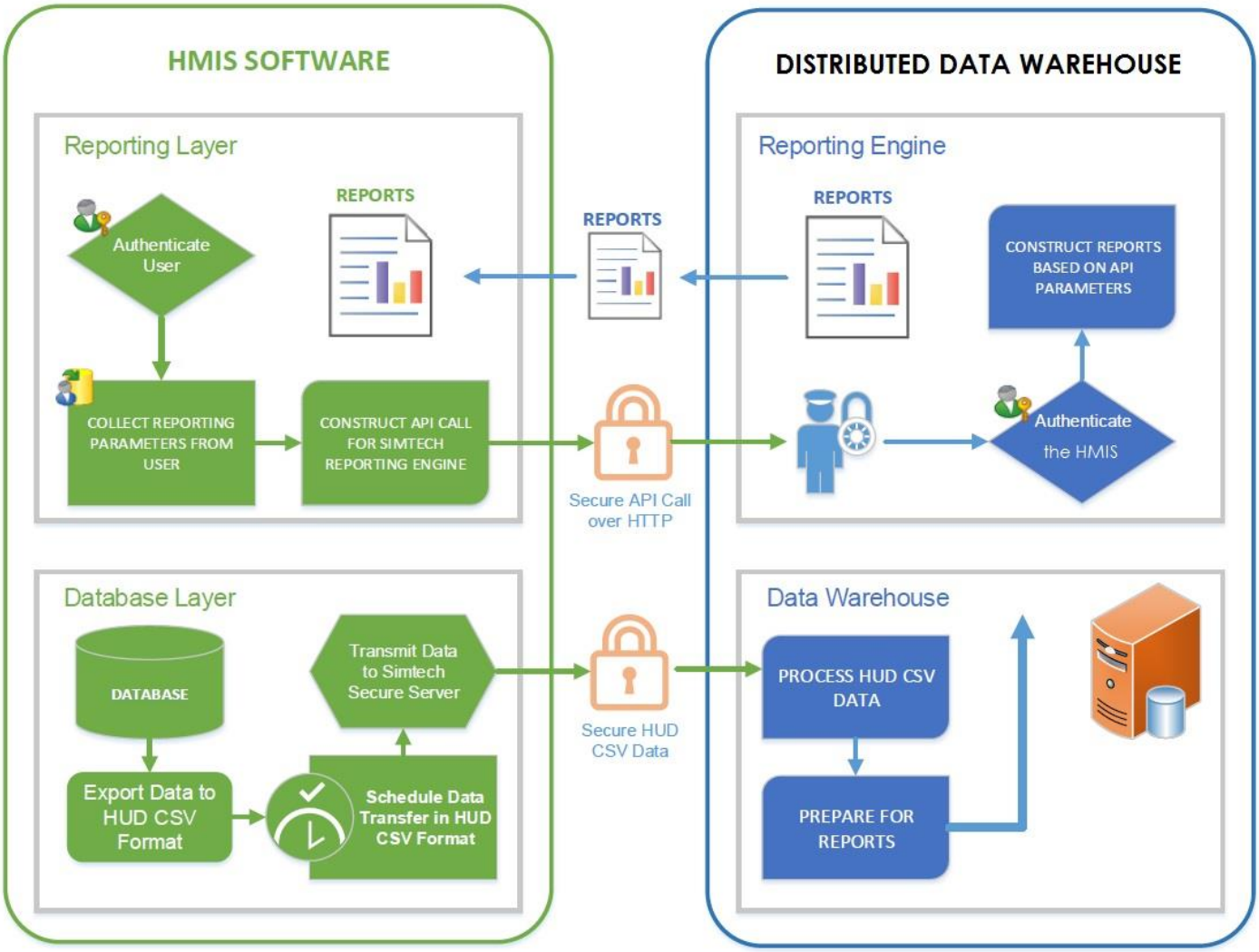
Gathering HMIS data in a repository outside of the HMIS software vendor's hosting environment provides a failover in the event of a data loss. It is also simpler to switch software if both the current software and the new one can exchange information in the same way.

Freedom of Choice

Community action agencies will have different operational and reporting requirements than what individual emergency shelters will have. National non-profits such as Salvation Army and Catholic Charities also have a business need to have a global lens across all of their programs. Forcing each operating location to use the HMIS of the region it resides in prevents this and is unnecessary if DDWs are implemented.

HOW IT WORKS

DDW works through web services which are facilitated by the adoption of automated data export from the source HMIS provider(s). Data is provided in either of the published HUD exchange formats (either CSV or XML) and prepared for reporting readiness by the DDW. Once processed, users are able to pull reports either by logging into the DDW and entering in the report selection criteria there or through the adoption of a *DDW Report Call API* by the HMIS vendor.



ADVANTAGES OF DDWS OVER EXCEL-BASED DISTRIBUTED REPORTING TOOLS

The Excel based *APR Generation Tools* and *ESG CAPER Generation Tool* are evidence that HUD mandated reports can be produced outside of a HMIS software. These tools are a cost-effective and accurate alternative to reports being generated natively from a HMIS. There are however technical limitations of

Excel which can be overcome with the DDW approach. Data warehouse environments leverage high-end servers and/or cloud based computing power to provide real-time access to vital information.

- Ability to produce all types of HMIS reports from one common framework, and subsequently one code base. The Report Gallery at the end of this document highlights just some of the reports that are available via DDW.
- DDWs can have built in capacity for GIS mapping.
- DDWs have the capacity to perform advanced client deduplication scripts that are needed for regional reports such as the *Annual Homelessness Assessment Report (AHAR)*.
- DDWs can run on high-powered servers and/or the cloud. Both offer superior speed and performance when compared to the average desktop computer that would be used to run the Excel-based reporting tools. Performance tests have shown DDWs are capable of processing eight (8) years of HMIS data for an entire CoC in less than 10 minutes.
- DDWs can have job scheduling capabilities which allow user to set dates for the reports to be run automatically.
- Reports such as Data Quality Scorecards and APRs can be automatically sent to the email address of predefined project contact(s).
- DDWs can be accessed by multiple users simultaneously whereas only one user can access Excel at a time.
- DDWs can have role-based security to limit access to data on a need to know basis. There is no such role-based security in Excel.
- DDWs can support various data exchange formats simultaneously. This can be helpful for circumstances such as the transition from the 2010 data standards to the 2014 data standards.
- DDWs can support advanced data cleansing routines and perform readiness checks over the data prior to running a report.
- DDWs are flexible and allow for reporting at various levels. Excel is limited to reporting at the CoC, agency or program level.
- DDWs offer a more attractive and intuitive user interface than the Excel based distributed reporting tools.
- There are many versions of Excel to support all with one tool (Excel 2007, 2010 and 2013) whereas a DDW has no client-side requirements other than a current web browser.

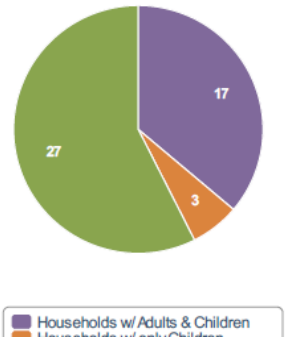
ADVANTAGES OF INTERNET CONNECTED DISTRIBUTED DATA WAREHOUSES

- Ability to incorporate live feeds of non-HMIS data (i.e. temperature, census data, etc).
- Ability to integrate data gathered from mobile apps such as the HUD Point In Time Counting Tool.
- Ability to share charts and reporting figures to public and private dashboards running on mobile devices and desktop PCs.
- Ability to integrate with other data management systems through pre-defined exchange protocols and APIs.
- Ability to send aggregate counts to other reporting systems such as HUDHDX and eSnaps.
- Native email capabilities. In a server based environment the automatically generated reports can be sent to pre-designated contacts on a set interval.
- Ability to automatically poll for updates
- Ability to define service areas. AHAR asks for a breakdown of clients served that were from within the CoC boundaries. Unless the zip codes that comprise the region are defined there is nothing to match the zip code of last prior residence against. Servers with Internet access can query the USPS zip code database to create this list prior to running the report.

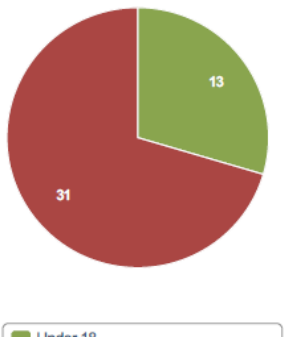
Exhibit A: Point In Time Report Derived Using DRM Tools, Mobile App, and Offline HMIS

Total Households and Persons	Sheltered			Unsheltered	Total
	Emergency	Transitional	Safe Haven		
Total Households	22	0	0	13	35
Total Persons	31	0	0	16	47
Number of Children (under age 18)	9	0	0	4	13
Number of Persons (18 - 24)	0	0	0	3	0
Number of Persons (over age 24)	22	0	0	9	31

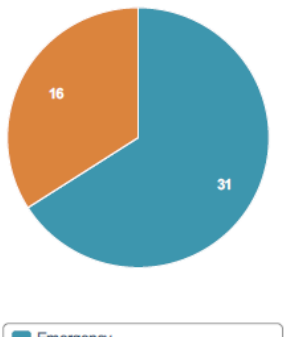
Household Types



Age Groups



Program Types

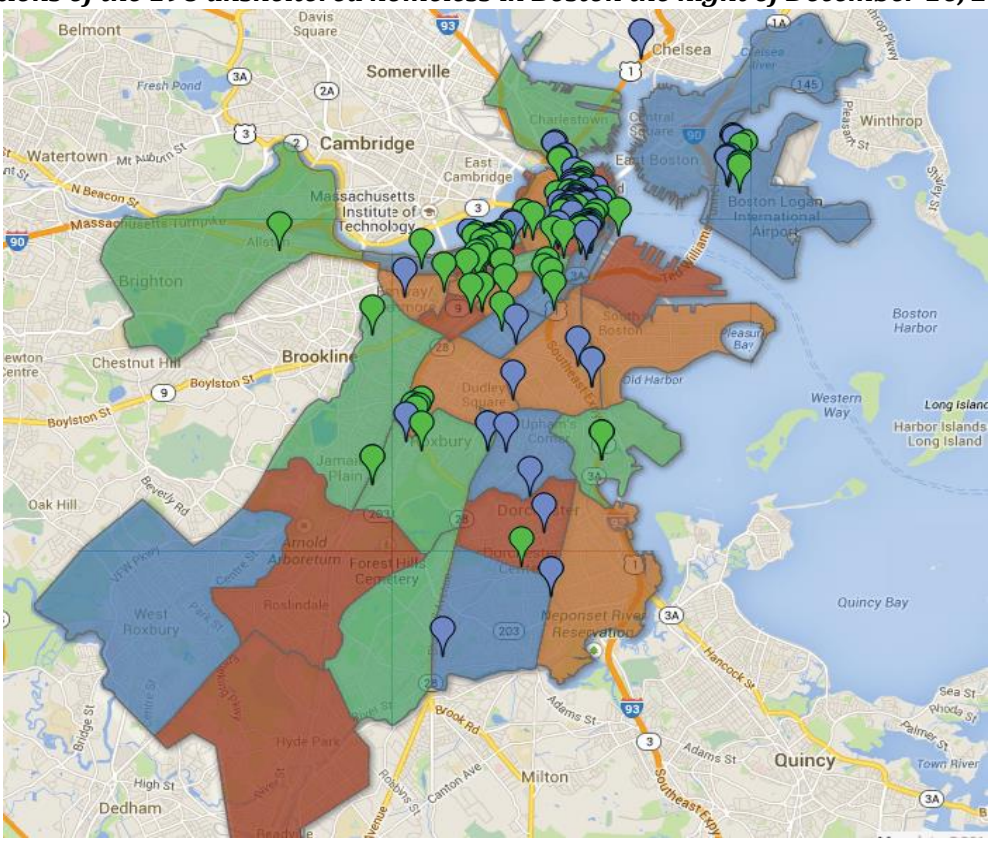


CASE STUDY: BOSTON POINT IN TIME COUNT

On Wednesday June 4th, Deputy Director of *Boston's Department of Neighborhood Development*, Elizabeth Doyle, represented the City of Boston at the White House for the acceptance of the *Mayor's Challenge to End Veterans Homelessness*[i] by 2015. The magnitude of this pledge is better understood after looking at the extent of veteran homelessness in Boston. Figures derived using a DDW indicated there to be 414 homeless veterans living in the City in March of 2014. 49 of these determined to be chronically homeless[ii] according to shelter staff and 69 were found to be chronically homeless according to the clients' historical data.

On December 16, 2013 Boston became the first major city in the nation to use the *HUD Point In Time Counting Tool* mobile app during their annual homeless census. Data gathered from the app was posted to a DDW where reports and maps were generated in real-time as the data was being gathered. According to the data collected, 15 of 198 (7.5%) homeless individuals living on the street were veterans. On that same night there were 203 veterans residing in shelter.

Locations of the 198 unsheltered homeless in Boston the night of December 16, 2013[iii]



*Shape files Created by Boston Redevelopment Authority and BPHC

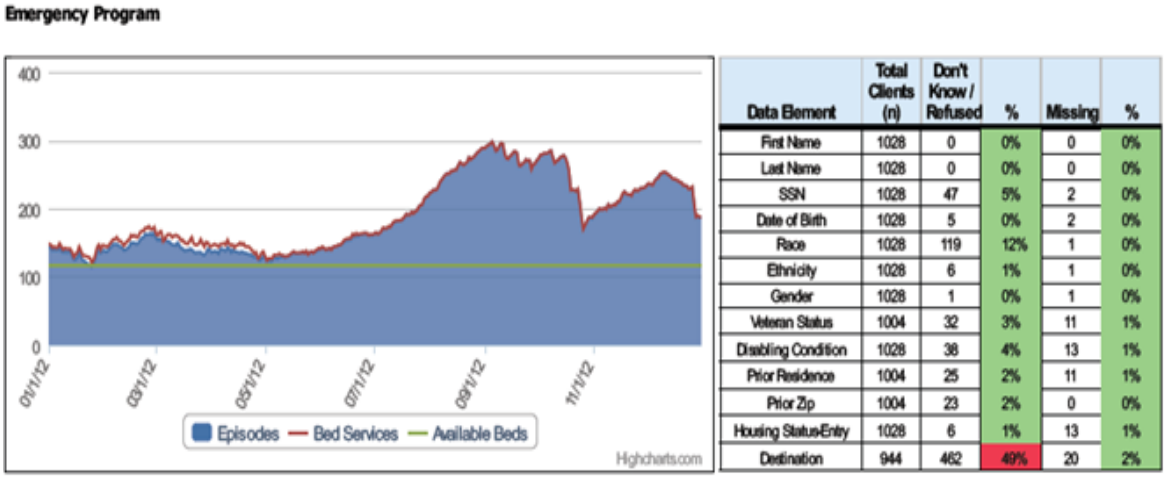
Total Surveys Submitted:	**198**
Total Interviews:	112
Total Observations:	86

CASE STUDY: MASSACHUSETTS HPRP APR

This approach was recently put into practice to create the final statewide *Homeless Prevention and Rapid Re-housing Program (HPRP) Annual Performance Report (APR)* to demonstrate to HUD the efficacy of the $18.4M in Federal stimulus dollars that were put to use within the Commonwealth of Massachusetts. The state's primary HMIS vendor was having technical issues that were preventing them from creating the report. In addition to the technical issues, the grant manager for the state's HPRP program was going on maternity leave. The contract was signed the day before Thanksgiving and the report was due in just five working days. The decision was made to leverage the reporting logic within the APR Generation Tool but to handle all of the data gathering, cleansing, and data selection within a server-based data warehouse environment.

> *DHCD turned to Simtech Solutions in order to assist us in compiling our final HPRP APR in November of 2012. In trying to compile our APR, we had been faced with several technical issues with our HMIS vendor and reduced staff capacity on our end, since our HPRP program had already ended. In addition, as a statewide HPRP grantee, we had to collect and clean data from multiple vendors using various HMIS systems across the state. DHCD recognized that we needed additional help and expertise to complete the report on time and so we turned to Simtech Solutions for that help. Matt and his team quickly moved into action handling all of the communication, data collection, quality checking and technical issues directly with our multiple subgrantees. Within five days Simtech had completed our APR and we were able to make a timely submission to HUD. We were relieved to be able to turn to Simtech Solutions for their advanced knowledge and expertise in HMIS and, particularly with HPRP APR generation and we are confident that the final product contains high-quality data to reflect our HPRP program.*
>
> Brendan Goodwin
> Director, State Rental Assistance Programs
> Massachusetts Department of Housing & Community Development

Exhibit B: Data Quality Scorecard Used to Check Report Readiness

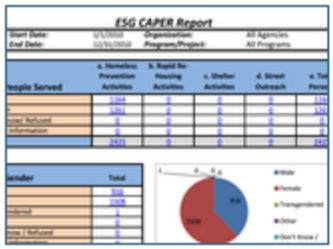


Data Element	Total Clients (n)	Don't Know / Refused	%	Missing	%
First Name	1028	0	0%	0	0%
Last Name	1028	0	0%	0	0%
SSN	1028	47	5%	2	0%
Date of Birth	1028	5	0%	2	0%
Race	1028	119	12%	1	0%
Ethnicity	1028	6	1%	1	0%
Gender	1028	1	0%	1	0%
Veteran Status	1004	32	3%	11	1%
Disabling Condition	1028	38	4%	13	1%
Prior Residence	1004	25	2%	11	1%
Prior Zip	1004	23	2%	0	0%
Housing Status-Entry	1028	6	1%	13	1%
Destination	944	462	49%	20	2%

REPORT GALLERY

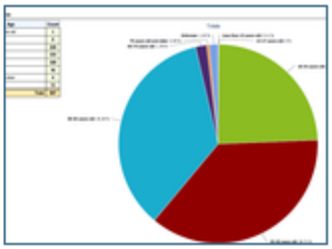
The reporting modules that currently exist in Simtech Solutions' distributed data warehouse platform are shown below. The full library of reports, and more details on each, can be seen by clicking here.

Federal Partner Reports

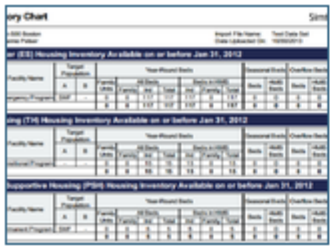


ESG CAPER Report

Annual Performance Report (APR)

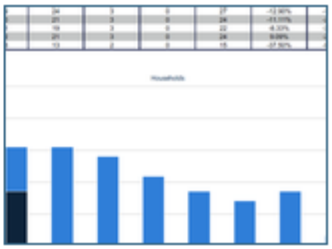


PATH Summary Report

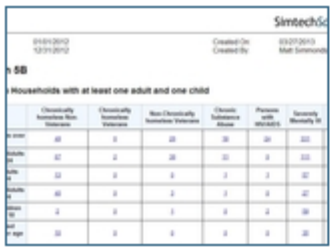


Housing Inventory Chart

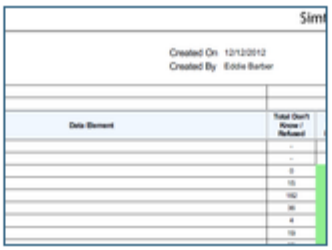
Unsheltered Homeless Summary Report



Point in Time Trend Report



HUD SuperNOFA

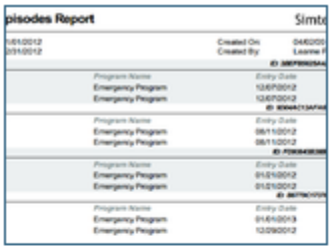


HMIS APR

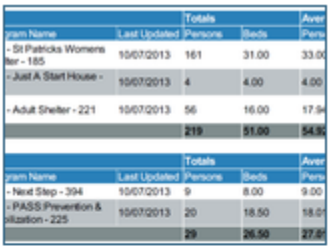
Point In Time Summary Report

REPORT GALLERY (CONT.)

Data Quality Reports

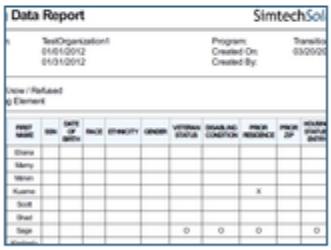


Overlapping Episodes Report

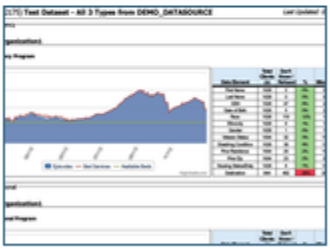


AHAR Readiness Report

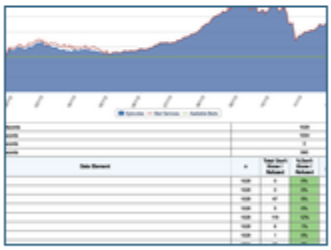
HUD Chronic Homelessness Audit



Missing Data Report



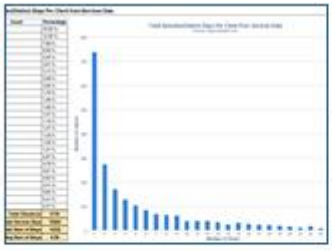
Data Quality Summary Report



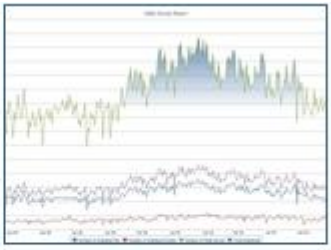
Data Quality Scorecard

Performance Measurement Reports

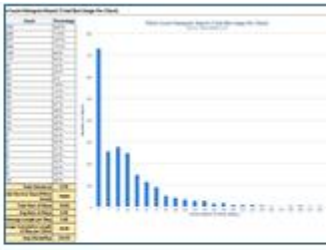
Cumulative Stay Analysis



Recidivism / Episode Counter



Daily Client Census Trends



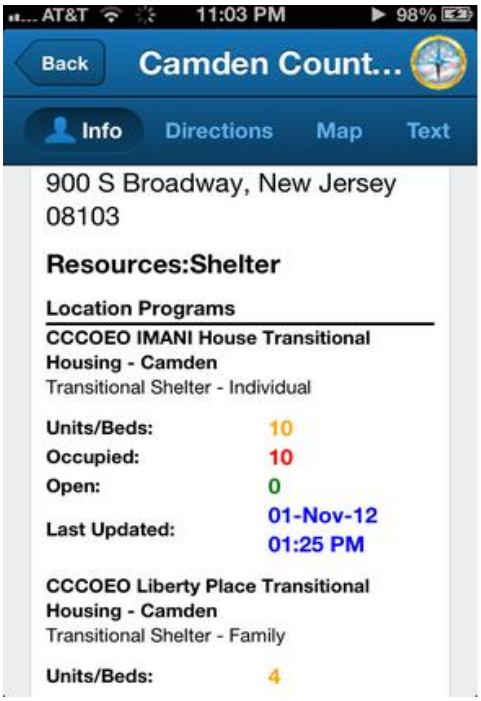
Pillow Count Histogram

OPEN DATA

The first milestone action outlined within the *White House Digital Government Strategy*[iv] asks Federal agencies to "Make open data, content, and web APIs the new default". The adoption of APIs within both HMIS and the DDWs allows for data to be shared with the end consumers so that it can be put to work.

The image to the right demonstrates how housing inventory and bed utilization data provided via HMIS can be used to support effective information and referral systems. This example happens to be from Simtech's *Show the Way* mobile application but with the adoption of open data practices the floodgates open to software developers to create a myriad of other consumer-centric tools.

Researchers, the press, and everyday citizens will continue to demand access to information on homelessness and housing. DDWs can provide this access while still providing the necessary protections to confidential client information.



IN CONCLUSION

The distributed data warehousing methodology is a cost-effective means of providing increased transparency and accountability for Federal partners and taxpayers alike without compromising the privacy and security of the people being served. The approach leverages HUD's prior investments in the *APR* and *ESG CAPER Reporting Tools* while providing a de-centralized locale for the data gathered via the *HUD Point in Time Mobile App* to reside. Most importantly, this framework can help to build a common understanding of the issues faced by the homeless while simultaneously helping to gauge the efficacy of the work being done to address these issues.

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[i] Fact Sheet: Mayors Challenge to End Veteran Homelessness, WhiteHouse.gov
[ii] Defining Chronic Homelessness: A Technical Guide for HUD Programs, SNAPS Office Sep. 2007
[iii] Point in Time Regional Command Center, Simtech Solutions Inc.
[iv] White House Digital Government Strategy, Office of Management and Budget.