

CUNY-IBM Watson Milestone 2

Group Name: Watson LMSW

Business Case Name: Watson LMSW

Group Members: Kimberly Sy, Nekita Singh, & Lizeth Mejia
of City University of New York, Queens College

Submission Video Link: <http://youtu.be/TRwdT1tmW4g>
(Youtube link)

Group Page Link: smartpitch.org/group/watson-lmsw
(SmartPitch.org page link)

Case Prompt: City Services. Watson LMSW is a Statewide Automated Child Welfare Information System (SACWIS) and virtual caseworker assistant that will provide social workers with the support they need to effectively address child abuse and maltreatment cases more efficiently and accurately than ever before.

PROBLEM STATEMENT

Nationally, child welfare workers have an average caseload that often exceeds recommended levels by more than double (Child Welfare Information Gateway 1). Case workers routinely assume the pseudo roles of counselor, investigator, judge, and enforcer all at once and often with little to no experience in any of these fields. New hires typically leave within one year or less due to widespread feelings of inadequacy (Burstain 5). In New York State, turnover rates reach as high as 25% (Borges, 2009). The consequences of an overburdened staff can often lead to mishandled cases and child fatalities. The New York Office of Children and Family Services indicates that from 2008-2009, 73% of their reviewed child fatalities had a prior Child Protective Services report and implied maltreatment assessment (OCFS, 2008/2009 Report on Child Fatalities 7). This means that 73% of their reviewed child fatalities in 2008 could have been reasonably prevented had their cases been pursued and handled appropriately. In that year, there were 163,808 reports of child abuse, 51,830 indicated reports, and 78,891 children in the indicated reports statewide. As the third most populous state with an extremely diverse population, it is not surprising to find that our Office of Children and Family Services is fatigued.

The Statewide Assessment of New York's Office of Children and Family Services discovered several areas in need of improvement. They highlighted poor handling of high risk cases and poor application of abuse prevention programs as two huge gaps in service. Because of the burdens that intake and investigations put on caseworkers, not enough is being done for children to prevent abuse once they are in the state's care. A child of New York is 127.7% more likely than the national average to have abuse recur 6 months after an abuse report is filed (Robert Dick Jr. 8).

CONNECTIONS

CONNECTIONS was New York State's response to Federal legislation requiring that each state monitor and report on foster care and adoption services in the form of a Statewide Automated Child Welfare Information System (SACWIS). As of 2001, system costs for CONNECTIONS have exceeded a staggering \$362 million (Stinger and Green). This expensive, largely incomplete, and inefficient system has had a huge impact on the children and families served. CONNECTIONS routinely loses data entered into the system. Because of this, caseworkers and administration must duplicate all data entry on paper, burdening child welfare offices with more paperwork than they have ever had before. CONNECTIONS also fails to generate adequate management reports. This prevents supervisors and managers from properly overseeing caseworker progress and from providing critical decision-making advice. It is even more troubling to find that CONNECTIONS also fails to simply maintain an accurate registry of previous child abusers. Searches for known child abusers fail to return matches 40% of the time, leading to the premature closure of many child abuse reports that leave children in very dangerous situations (Stinger and Green).

PROPOSED SOLUTION

Watson LMSW proposes a new City and Statewide Automated Child Welfare Information System (SACWIS) housed on the IBM Watson platform (e.g. see Fig. 1.3). Our system will integrate the Judicial System, the Administration for Children's Services (ACS), the Office of Children and Families Services (OCFS), the Welfare Management System (WMS), the Child Care Review Service (CCRS), the Benefits Issuance and Control System (BICS), and other relevant NYC or NYS social services systems

with Watson's cognitive computing capabilities to address child welfare cases more accurately and efficiently than ever before. With Watson's ability to make informed opinions and to find patterns in seas of data, our system will have the capacity to be more than a one stop collection center of information as it currently is today. Like the current statewide platform, CONNECTIONS, Watson LMSW will operate as a single integrated database for the collection of all child protective, preventive, foster care and adoption service information. Unlike the current platform, Watson LMSW will also serve as an automated caseworker assistant.

Caseworkers are the first responders to all child abuse reports. Their initial assessments of abuse are extremely important. Unfortunately, indicators of abuse and maltreatment can come in a wide variety of unstructured forms: 1) physical indicators, 2) child behavioral indicators, and 3) parent behavioral indicators. Physical indicators alone can vary extensively. Simple diagrams (e.g. see Fig. 1.1 & 1.2) attempt to teach mandated reporters how to analyze bodily injuries; a skill that can only be gained through years of experience that most NYC caseworkers simply don't have because of high turnover rates. NYC has an average Indication Rate of a mere 39.2%. This means that 60.8% of all NYC child abuse and neglect cases are unfounded (ACS). We allege that the increasing number of so-called unfounded reports might actually be a reflection of the inadequately supported Administration for Children's Services and their under-trained and over-worked child welfare staff. Given the burden of caseloads and the the lack of support and resources offered to caseworkers, it is not surprising to find that caseworkers are often unsuccessful at interpreting unstructured data such as bodily injuries to determine whether a child has actually been physically abused.

Watson LMSW will support child welfare workers from the moment an abuse report is filed. Through innovative image analysis, Watson LMSW will analyze patterns of physical abuse, considering the size, shape, and location of an injury on a victim, and justify the determination of neglect or maltreatment with supporting evidence and a level of confidence. With Watson's natural language processing abilities, our system will equally analyze child behavior and parental behavior indicators collected during in-person interviews throughout the investigation period. Leveraging the large corpus of structured and unstructured data stored in CONNECTIONS, the current SACWIS system, Watson LMSW will have decades of expertise under its belt. However, caseworkers are not without their own opinions of what child abuse and neglect looks like. As caseworkers take input from Watson, Watson also takes input from caseworkers in order to learn and improve its abuse indication skills. Through frequent use and feedback, Watson LMSW is poised to set the national standard for all Statewide Automated Child Welfare Information Systems throughout the United States.

After intake and indications of abuse, social workers will automatically receive a detailed report and action plan with next-step investigation recommendations that evolve just as their case evolves. High risk cases will be flagged and prioritized within seconds. An internal security clearance system will allow action plans to be viewable by all stakeholders and investigators on the case, making communication within and between different chaotic departments more efficient. Watson LMSW will continuously identify non-obvious patterns and connections between data submitted and provide rapid insights for supervisors and managers to review within their customized management reports. Recommendations for caseload and caseworker management will be available through their portal of this system. Watson will learn how different county offices like to operate through frequent use and interaction with administration. Over time, with each individual's taste preferences in mind, Watson will be able to fine-tune its recommendations to suit every caseworker, supervisor, and manager within all county offices throughout the five boroughs. With Watson LMSW taking care of preliminary analyses of investigations,

case workers will have a lot less on their plate. Now, caseworkers will be able to focus on conducting more thorough investigations and making sure prevention and support programs are more strongly applied to all of the families and children within their care.

PRICING INFORMATION

We have identified two tangible Key Performance Indicators (KPIs) that showcase how New York City's Administration for Children's Services (ACS) can increase cash flow and decrease expenditures: 1) employee turnover, 2) litigation services and tort law settlements associated with mishandled cases. Watson LMSW estimates a 10% to 30% reduction in employee turnover which will gross a 10% to 30% or \$372,659 to \$1,117,978 reduction in training costs (see Table 1.1). We also estimate a 10% to 30% reduction in mishandled cases which will gross a 10% to 30% or \$107,709 to \$323,128 reduction in litigation and tort law settlement costs associated. Our system will generate up to 1.1 M in savings. We have also identified additional cash flow of 65.2 M (see Table 1.2) that may be redirected from CONNECTIONS, the current SACWIS platform, to support Watson LMSW.

We have also identified several intangible Key Performance Indicators that further exemplify the value of Watson LMSW: 1) citizen engagement, 2) the reputation of ACS, and 3) the retention and recruitment of high performing social workers. Watson LMSW will significantly increase ACS's citizen engagement by decreasing time spent on the inefficient CONNECTIONS platform and increasing face to face interaction between caseworkers and the children and families served. This will enable caseworkers to focus on problem resolution, treatment, education and prevention, decreasing prolonged stays in foster care and increasing their application of permanency solutions that will expedite reunification or placement in a more permanent home. Watson LMWS will also significantly better the reputation of ACS and, in turn, the administration's retention and recruitment of high performing social workers.

Through our research we have found that the software industry favors value-based and software as a service (SaaS) pricing models. We propose to target a small market of profitable customers: the NYS Office of Children and Family Services and the NYC Administration for Children's Services as well as other city or state-run child welfare offices within the United States. Based on these estimations, our system will price between 16 M and 33 M. If 16.32 M, 9.79 M will be allocated towards implementation and 2.18 M will be allocated towards software as a service (SaaS) over three years. If 32.64 M, 19.58 M will be allocated towards implementation and 4.35 M will be allocated towards software as a service (SaaS) over three years.

The Title IV-E Social Security Act of 2010 allocated \$3.8 billion to be spent on Statewide Automated Child Welfare Information Systems (SACWIS), and the training, demonstration, and administrative costs associated (US DHHS). This legislation offers states to claim 50% to 75% partial funding to plan, design, develop, and implement a Statewide Automated Child Welfare Information System.

TIMELINE

We project a 24 month timeline for development, implementation, and post-implementation (see Table 1.3). To launch Watson LMSW, we would need IBM's Watson technology and development support, the financial investment of the City of New York, clearance to extract all child welfare data from the current Statewide Automated Child Welfare Information System (SACWIS) called CONNECTIONS, and the Administration for Children's Services' full administrative and training support.

APPENDIX

Figure 1.1. Watson will determine mechanisms of injury through image analysis.

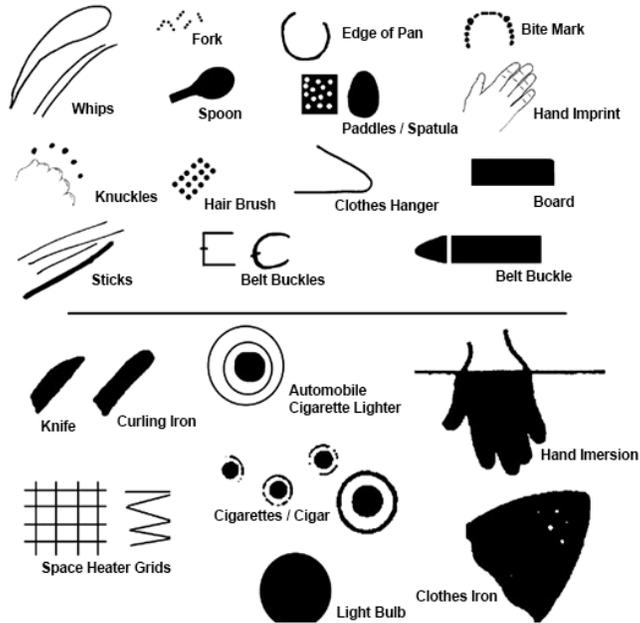


Figure 1.2. Watson will distinguish between normal and suspicious bruising or injury areas & support indications of abuse with supporting evidence and explanations.

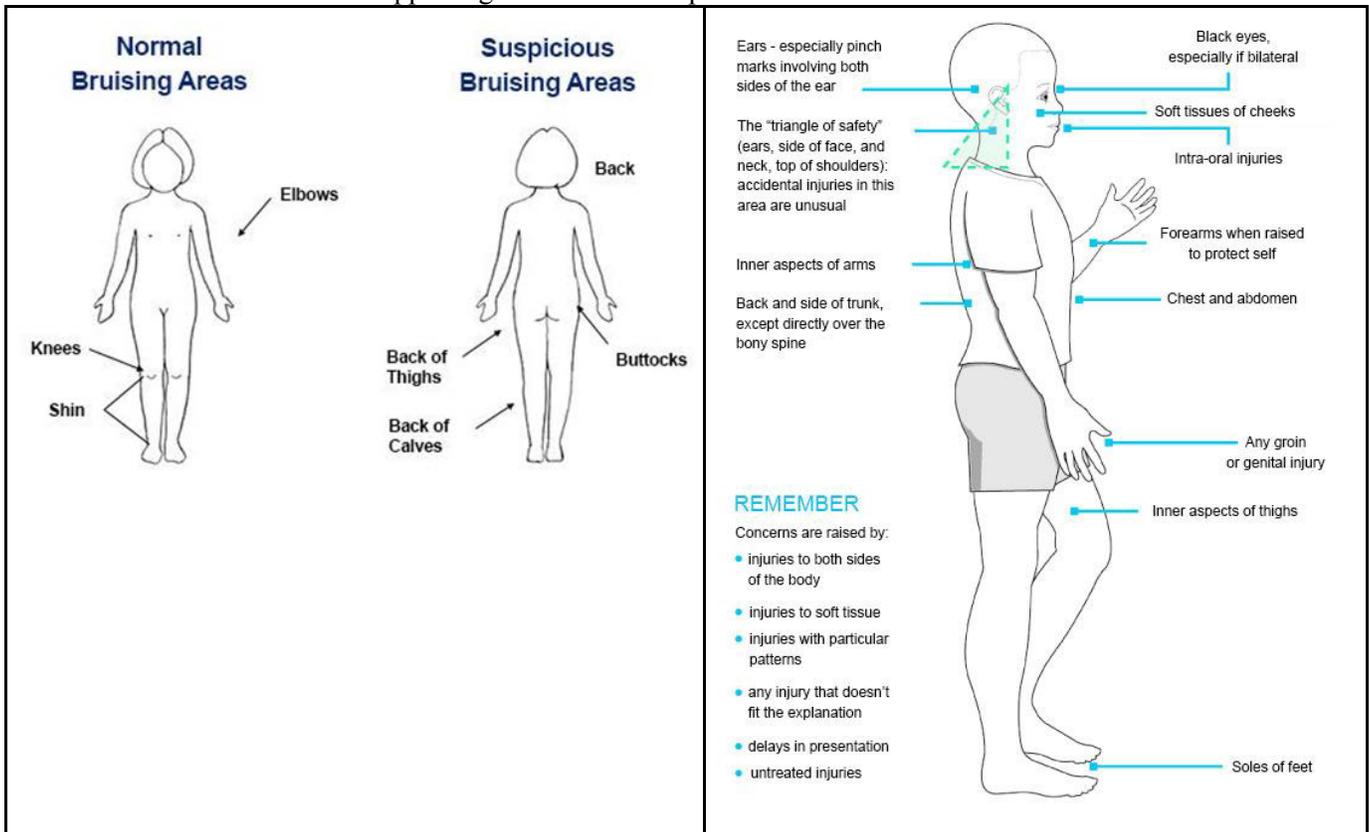


Table 1.1. Key Performance Indicators (KPIs) with projected 10-30% savings.

KPIs	Cost/Yr (dollars)	Savings 10% (dollars)	Savings 30% (dollars)
Training	\$2,649,500	\$264,950	794,850
Litigation Services	\$367,840	\$36,784	\$110,352
Tort Law Settlements	709,255	70,925.50	212,776.50
Total	3,726, 595	372,659.50	1,117,978.50

Table 1.2. Cash Flow from CONNECTIONS, the old SACWIS.

Cash Flow Origin	Cost/Yr (dollars)	Year 1 20% Cash Flow	Year 2 50% Cash Flow	Year 3 75% Cash Flow	Total Cash Flow
CONNECTIONS	\$38,400,000	\$7,680,000	\$19,200,000	\$38,400,000	\$65,280,000

Table 1.3: Development & Implementation Timeline for Watson LMSW

Systems Development Life Cycle (SDLC) Step	Start Date	End Date
Project Plan & Kick Off	Month 1	Month 1
SACWIS Requirements Validation	Month 1	Month 5
Logical and Conceptual Design	Month 1	Month 5
Change Management	Month 5	Month 8
Detailed Design	Month 5	Month 10
Software Construction & Development	Month 10	Month 15
System Testing	Month 15	Month 19
Data Conversion, Migration, and Testing	Month 10	Month 19
User Acceptance Testing	Month 19	Month 21
Implementation Step	Start Date	End Date
Planning	Month 15	Month 19
Training	Month 19	Month 23
Pilot	Month 20	Month 23
Full Implementation	Month 23	Month 24
Post-Implementation Step	Start Date	End Date
Transition & Maintenance	Month 24	Month 36
Federal SACWIS Review	Month 34	Month 36

Figure 1.3. Watson LMSW's Statewide Automated Child Welfare Information System and Virtual Caseworker Assistant application mock-up on desktop and iPad.



REFERENCES

- ACS. *Abuse/Neglect Report by Community District - 2009 - 2013*. Rep. Administration of Children's Services, 2013. Web. 4 Dec. 2014.
- Burstain, Jane. *A Better Understanding of Caseworker Turnover within Child Protective Services*. Rep. no. 09-364: Center for Public Policy Priorities, 4 Feb. 2009. Web. 12 Oct. 2014.
- Child Welfare Information Gateway. *Caseload and Workload Management*. Washington, DC: U.S. Dept. of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Child Welfare Information Gateway, Apr. 2010. Issue Briefs. Web. 12 Oct. 2014.
- Dick, Robert. *New York State's FY 2010-2014 Final Report And FY 2015-2019 Child and Family Services Plan*. Rep. no. 14-02. New York State CFSP and APSR, June 2014. Web. 29 Nov 2014.
- Jones, William G., U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau, and Office of Child Abuse and Neglect. *Working with the Courts in Child Protection*. Child Welfare Information Gateway, 2006. Child Abuse and Neglect User Manual. Ser. 2006. Web. 12 Oct. 2014.
- Stringer, Scott M., and Roger L. Green. *Too Much, Too Little, Too Late. An Assembly Investigation of CONNECTIONS-New York's Statewide Child Welfare Computer System*. Rep. Oversight, Analysis and Investigation Committee / Children and Families Committee, Mar. 2001. Web. 29 Nov. 2014
- New York State Office of Children and Family Services (NYS OCFS). *2008/2009 Report on Child Fatalities*. New York: OCFS, 2011. Web. 12 Oct. 2014.
- New York State Office of Children and Family Services (NYS OCFS). *Statewide Assessment Instrument*. Rensselaer, New York: OCFS, 2008. Web. 12 Oct. 2014.
- New York State Office of Children and Family Services (NYS OCFS). Public Information Office. *Caseworkers Make a Difference*. Edward Borges, 7 Apr. 2009. Web. 29 Nov. 2014.
- U.S. Department of Health and Human Services. *Budget in Brief*. Washington, DC: US DHHS, 2010. Web. 12 Oct. 2014.
- U.S. General Accounting Office (US GAO). *Child Welfare: HHS Could Play a Greater Role in Helping Child Welfare Agencies Recruit and Retain Staff*. Washington, DC: GAO, Mar. 2003. Web. 12 Oct. 2014.