Information
Technology &
Telecommunications

TESTIMONY OF THE DEPARTMENT OF INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS

ON INT. 1696, A LOCAL LAW TO AMEND THE ADMINISTRATIVE CODE OF THE CITY OF NEW YORK, IN RELATION TO AUTOMATED PROCESSING OF DATA FOR THE PURPOSES OF TARGETING SERVICES, PENALTIES, OR POLICING TO PERSONS

October 16, 2017

Good afternoon, Chair Vacca, and members of the Committee on Technology. My name is Don Sunderland, and I am Deputy Commissioner for Enterprise and Solution Architecture at the Department of Information Technology and Communications, also known as DoITT. Joining me is Craig Campbell, Special Advisor in the Mayor's Office of Data Analytics, known as MODA. I'm here to discuss Chair Vacca's legislation, Introduction 1696, a bill that would require agencies to publish the source code of algorithms they use, and allow users to test those algorithms. This is a very timely discussion, and I thank the Chair and this Committee for initiating it. City agencies rely on computer programs to varying degrees to assist in targeting and delivering services to their clients, and I am happy to talk about the broad technical processes that guide the City's use of algorithms.

First, I'd like to provide some background to the Committee on the work my division does at DoITT. The Enterprise and Solution Architecture division comprises a team of technical architects who help DoITT and its sister agencies identify technology solutions to address their business needs. A relevant example of this is the recently launched NotifyNYC app, which we assisted NYC Emergency Management (NYCEM) in developing. DoITT's "Insource Team," a group that assists agencies in managing special technology projects, was dispatched to work with NYCEM on this app starting last year. This team includes several positions that agencies may not hire on their own for such a specialized project, such as a technical lead, Android and iOS developers, a UX/UI designer, and more.

While our services are available to all City agencies, this does not afford us a comprehensive view of technology across the City. Many agencies have substantial technology shops of their own, and require no assistance from us at all. Others only need us to help them in the design or delivery of specific features required by the total application architecture. In all cases, we strive to deliver whatever services the agency needs to achieve its technology goal. This work provides us with broad exposure to a variety of systems implemented by the various agencies, but agencies rely on their own subject matter experts to devise strategies based on the goals they wish to achieve.

No matter the level of engagement, DoITT develops technical solutions to fulfill policy goals and support business processes determined by agencies. In other words: by and large, we aren't making agency rules, decisions, or policy. We are providing the technology that helps agencies bring those elements into the world and onto our streets.

This bill seeks to increase transparency in government decision-making processes, which is a laudable goal. We understand the impetus for this legislation, and believe that this bill is an excellent way to start the conversation. The Chair has been a great partner in our transparency efforts over the last few years, and we are eager to work with the Committee to achieve some of the goals of this legislation in ways that will be useful to New Yorkers.

That being said, Introduction 1696, in its current form, presents significant operational concerns that we must address directly.

First and foremost, there are considerable security concerns. It is the opinion of our cybersecurity experts that publishing algorithms would generate considerable risk, providing a roadmap for bad actors to attack crucial City systems. Those looking to cause damage could use knowledge of these algorithms to circumvent important criteria put in place to prevent abuse of these processes. There is also meaningful risk to the private information of New Yorkers, since providing public access to decisions regarding individual benefits or services could provide tools for third parties to infer specific personal information, such as economic or disability status, of persons receiving those benefits.

Second, the scope is all-encompassing. An algorithm is a set of unambiguous instructions. All software programs use sets of unambiguous instructions to carry out their functions. In targeting all algorithms involved in rendering decisions regarding service delivery or evaluative processes, the legislation potentially targets every computer program in the city, which, as you could imagine, would be an incredibly large undertaking. Almost every program supports agency operations by producing data or interim values used to support the decision-making process of the agency—by humans or through automation. As a result, under this legislation, City agencies would be required to divulge the inner workings of all of their software. Aside from the sheer scope of this effort, the City's ability to do so would face innumerable legal and practical constraints, such as the use of software vendors' proprietary code or the inability to accurately identify the valid source code of many older systems.

Third, testing is not possible. Setting aside the scope issue for the moment, in most cases, the ability to create public access to test the accuracy of the decisions being rendered would be nearly impossible. Decisions carried out by systems are driven by highly complex states of data and other factors that that could not be emulated for the purpose of public testing. Moreover, none of the relevant programs were written to be free-standing, publicly usable software. DoITT and IT departments across the City would likely have to put in an extraordinary amount of time and energy just to create a new body of software that safely imitates the existing functionality.

Fourth, this bill comes with unintended consequences. The clear and laudable intent of the legislation is to provide transparency around the City's decision-making process and service delivery. But as

written, this legislation would deliver a deluge of information, the bulk of it likely unrelated to the services or decision in which the City's constituents are most interested, thus complicating the search for the very information it hopes to expose. Also, providing self-service "decision testing" could empower users to fabricate answers that will get them the response they want.

Most importantly, computers do not unilaterally make decisions. Even if it were possible to make this information available, the code is such a small part of decision-making. Often, algorithms take multiple sources of data and produce results that are contingent on many other contextual factors, including policy decisions made by City employees, and often shaped by local, state, and federal law. On the whole, algorithms *supplement* rather than replace the decision-making process made by City agencies.

I would like to share areas in which the City has proactively made strides in making certain kinds of algorithms transparent. The Mayor's Office of Data Analytics (MODA) recently unveiled an analytics project library, a platform that, in addition to sharing the results of MODA's analyses, also makes transparent the source code for these data analytics projects. When MODA's data scientists partner with City agencies on advanced data analytics projects, they are almost always using Open Data exclusively, so in these instances, publishing the intermediate steps of the analytics process would allow the public to apply the same process elsewhere. Craig Campbell from MODA is here today to answer questions you may have about this project.

Finally, an example taken from this project library can further explain the Administration's position on this legislation. Following the 2015 outbreak of Legionnaires' Disease in the Bronx, MODA worked with several agencies to identify and track all cooling towers in New York City. The results, in addition to the data sources and method used to conduct this analysis are available in the project library. However, the decision-making process in enacting policy to proactively prevent sources of Legionnaires in the future could not be unilaterally made based solely on that analysis.

We've had great successes in working with this Committee to enact meaningful legislation that has had made impactful changes in this administration's transparency efforts. Thus, we'd like to hear more from the Committee on the types of City decisions there is interest in making more transparent, and we can subsequently work with our partner agencies to formulate a focused effort to elucidate the decision-making process in those specific areas.

This concludes my prepared testimony. Thank you for the opportunity to speak, and I'm happy to continue the discussion with the Committee.

###

TESTIMONY OF THE LEGAL AID SOCIETY

The New York City Council
Committee on Technology

October 16, 2017

New York, New York

Presented by:

Joshua Norkin, Staff Attorney, Decarceration Project
Julie Fry, Staff Attorney, D.N.A. Unit
The Legal Aid Society Criminal Practice
199 Water Street
NY, NY 10038
718-577-3509
jnorkin@legal-aid.org

Introduction

Thank you for the opportunity to testify concerning what the Legal Aid Society believes is one of the most important and concerning issues of our time—the rise of "big data", and the corresponding lack of transparency and accountability that has come with it. Today, we are pleased to submit testimony on behalf of The Legal Aid Society, which will focus on the proliferation of algorithms in the criminal justice system and its impact on our clients in New York City.

While short-comings of algorithms used by tech companies and Wall Street have become front-page news, there has been little public discussion of the dangers posed by the algorithms now being used in virtually every aspect of the criminal justice system. While such algorithms may not fuel catastrophes like the 2008 financial crisis, or the 2016 federal elections, their burden is being disproportionately shouldered by our clients and their communities. These algorithms erode the concepts of individualized justice, stand in opposition to principles of equal protection, and challenge both due process and fundamental fairness. They may result in wrongful convictions, and they undermine the presumption of innocence. Critically, they have been largely unregulated and hidden from public scrutiny.

We thank Chair James Vacca and the Committees on Technology for inviting our thoughts on the subject. We applaud the Council for its concern about the far reaching impact technology can have on the people of New York City, particularly those in low-income neighborhoods and communities of color.

Since 1876, The Legal Aid Society has been committed to providing quality legal representation to low-income New Yorkers. We are dedicated to ensuring that no New Yorker is denied access to justice because of poverty. The Criminal Defense Practice of The Legal Aid Society ("The Society") is the largest defender organization in New York City, representing a very substantial proportion of the persons charged with crimes in New York City.

The Society has several units currently investigating the impact algorithms and risk assessment instruments (RAIs) have on our clients. Our Decarceration Project, a project dedicated to bail reform and ending mass incarceration, has been closely monitoring the growing use of RAIs in bail reform. Our DNA Unit is one of the leading voices in the country on experimental and potentially scientifically unsound DNA interpretation techniques in the courtroom. The Society's Cop Accountability Project is dedicated to improving police transparency and accountability in New York City. The Juvenile Rights Practice is the primary provider of legal representation for youth who are the subject of child protective

proceedings and juvenile delinquency proceedings in the Family Courts of all five boroughs in New York City.

Greater Transparency And Accountability Is Needed Now

We support Intro #1696 which will require transparency in the development and administration of algorithms by New York City agencies, including the New York City Police Department. We hope that the legislation will be expanded to specifically address the concerns we raise in this testimony related to bail reform, DNA, and juvenile rights.

We are deeply concerned that the government's growing reliance on algorithms is disproportionately harming our City's most vulnerable populations. These algorithms are often "black boxes"—meaning that how they were constructed and how they function remain a mystery to policy-makers, government officials, legal organizations, as well as the very people the algorithms are impacting. Demanding full transparency is the first step toward accountability, fairness and, perhaps most importantly, informed decision-making on whether or not such algorithms should be used in the first place.

The "producers of risk-assessment tools—even nonprofit organizations—have not voluntarily released anonymized data and computational details to other

researchers, as is now standard in quantitative social science research."[1] This lack of transparency is the norm for algorithms and RAIs, not the exception. The failure to open up algorithms to meaningful scrutiny erodes the concept of individualized justice, standing in tension with basic due process and equal protection principles that are the bedrock of our criminal justice system. "The root of the problem is that automated criminal justice technologies are largely privately owned and sold for profit. The developers tend to view their technologies as trade secrets." [2]

Our greatest concern is that absent accountability algorithms will proliferate, amplifying the already existing race- and wealth-based disparities the exist in our City. Indeed, as our testimony seeks to show, this proliferation has largely already happened unnoticed. Algorithm's now pervade the criminal justice system at all levels, from policing, to delinquency proceedings in family court, to decisions for parole, and their use in DNA and forensic science. Much of this has happened within the past ten years, and has occurred with little public criticism or accountability.

The City Council now has the opportunity to permanently correct that. Algorithms are only as good as the data used to construct them—a significant hurdle for a City whose race- and wealth-based disparities pervade every level of

---

[1] Laurel Eckhouse, *Big Data May be Reinforcing Racial Bias in the Criminal Justice System*, Wash. Post (February 10, 2017).

[2] Rebecca Wexler, *When a Computer Program Keeps You in Jail*, N.Y. Times (June 13, 2017), *available at* https://www.nytimes.com/2017/06/13/opinion/how-computers-are-harming-criminal-justice.html

society. As long as algorithms rely on data from a society divided along racial and socio-economic lines they will inevitably cause outsized harm to our most vulnerable populations. Careful vetting, transparency, and a robust and open peer review process will work to minimize those harms, even if they cannot be fully eradicated. Minimally, it will give the public and organizations like Legal Aid more detailed information so that these algorithms can be scrutinized for constitutional and human rights violations. Now is the time for the City Council to act to pass comprehensive reform that will open up algorithms to real public scrutiny and accountability. Failure to do so risks further entrenching what Mayor DeBlasio has referred to as New York's "Tale of Two Cities."

***

Bail Reform and Pretrial Justice

Algorithms, used in RAIs, have become a fundamental component to the bail reform movement, and their adoption raises a number of concerns for the fair administration of justice in New York City. Any potential problems with RAIs are particularly acute in the preconviction context—where they will be used on presumptively innocent people not yet convicted of a crime. The passage of this bill is necessary to secure the full transparency required to properly vet these RAIs. Litigation in Wisconsin has already proven that without legislative oversight the companies pushing RAIs for use in the criminal justice system will not permit

individuals or their attorneys access to the data our source code needed to properly challenged the RAI.[3]

Beyond fundamental transparency issues, the use of RAIs implicates constitutional protections requiring the accused be provided with sufficient due process safeguards, as well as equal protection under the law. It is for these reasons that remain firmly opposed to the use of RAIs to predict "dangerousness" in bail determinations, a possible component of a statewide legislative fix. As part of our testimony we are submitting a more thorough policy statement detailing these concerns in more depth. While the letter focuses on the implementation of "dangerousness" RAIs in pretrial justice, it provides important context to the concerns we are expressing in testimony today (Attached as Exhibit A).

We would also like to provide the City Council with background on the RAIs being used in New York City. Currently, there are already two RAIs in used in pretrial release in New York City. Both of them raise concerns that should prompt City Council action to demand more transparency.

The RAIs were developed in New York City by the Criminal Justice Agency (CJA). The first has been in use since 2001. New York City uses a RAI to predict

[3] In *Wisconsin v. Loomis*, 881 N.W.2d 749 (Wis. 2016), 137 S. Ct. 1240 (Mar. 6, 2017), "[t]he court of appeals certified the specific question of whether the use of a COMPAS risk assessment at sentencing "violates a defendant's right to due process, either because the proprietary nature of COMPAS prevents defendants from challenging the COMPAS assessment's scientific validity, or because COMPAS assessments take gender into account." *Loomis*, 371 Wis.2d. at 243. The court rejected the appellant's demand that COMPAS release their data and source code for review.

failure to appear—it is run on every person accused of a crime and arraigned in a criminal court. To our knowledge, the tool has never been independently studied or verified, and anonymized data and source code have not been released to independent third parties. It is currently administered by the CJA through an interview that occurs before every arraignment.[4]

The tool gives judges one of three recommendations about someone's likelihood of returning to court. The Mayor's Office of Criminal Justice (MOCJ) and CJA have openly admitted the tool is out of date and ineffective.[5] For the past few years MOCJ has worked with CJA to redevelop the tool, but late last year the redevelopment process was terminated. In September, MOCJ and CJA conducted a forum at New York School of Law, that Legal Aid attended, in which they discussed the development of a new risk assessment tool to be unveiled in late 2018 or early 2019.[6] The City has contracted with the data scientist's Marie Van Nostrand and Jens Ludwig to help develop this new tool. The current tool will continue to be used in the interim.

Legal Aid has raised several concerns about the current RAI, and we believe it is likely biased against our clients. Scoring categories include warrant history, whether or not someone is employed, and whether or not someone has a working

---

[4] CJA does conduct its own internal studies which are available to the public on their website: http://www.nycja.org/. We have not asked for the data or information related to the construction of this RAI.
[5] http://blogs.law.nyu.edu/docket/events/redesigning-new-york-citys-pretrial-risk-assessment-and-recommendation-system/31861/
[6] Id.

telephone number. Reliance on these categories undoubtedly discriminates against the poor. Warrant history is so broad that a warrant from twenty years ago means our clients will not be recommended for release—even if that person returned to court voluntarily the following day. Given that over-policed communities of color are more likely to cycle through the system, we must accept that they are also more likely to accumulate a warrant, disproportionately deeming them higher-risk.

The RAI is also an example of how RAIs are not scientific, but creatures of policy. The tool tells judges that people are "recommended for ROR" or "not recommended for release." These labels are arbitrary constructs, written by the designers of the tool. This is also true of the cutoffs for the individual risk categories. People who are recommended for ROR are statistically 91% not likely to miss court. People who are not recommended are 76% likely to make all of their court dates. Why developers choose those specific cutoffs, and those specific labels is unclear, but it has nothing to do with science. The developers could have just as easily showed the raw statistical probabilities to judges instead of settling on the arbitrary labels.

In April, 2016, Mayor de Blasio announced a $17.8 million dollar supervised release program utilizing an RAI.[7] Since March 2017, MOCJ has used that RAI to screen people who have had bail set for eligibility in the Supervised

[7] http://www1.nyc.gov/office-of-the-mayor/news/336-16/mayor-de-blasio-citywide-rollout-17-8-million-bail-alternative-program

Release Program- which is limited to 3,000 spaces.[8] The tool purports to predict whether someone is likely to reoffend, and was constructed using data from 2009—the height of stop and frisk policing in New York City. While race is not explicitly considered by the tool, age is, and we feel the tool undoubtedly screens young people of color as a higher risk than their white counterparts

While the Supervised Release Program has been beneficial to a number of clients who would otherwise been detained on Rikers Island, Legal Aid, Brooklyn Defender Services, and the Bronx Defenders were all sufficiently concerned about biases in the RAI that we requested the anonymized data and source code from CJA and the Department of Criminal Justice Services. Those organizations, with the assistance of MOCJ, were willing to turn over the data to us, which we expect will occur within the next few weeks. The process has taken over a year, and without our insistence it is unlikely the data would have been released so the RAI could be independently reviewed.

There evidence to support our concerns about the Supervised Release RAI- the RAI weights age at the time of offense the most heavily. If you are between 16-19 at the time of the offense you get six risk points- more than any other category. We believe the tool routinely excludes young people from Supervised Release who

[8] http://www.wnyc.org/story/instead-bail-city-tries-releasing-more-defendants-supervision/

should otherwise be eligible, and we believe this is due in part to discriminatory policing tactics in the underlying data set.

Additionally, the RAI relies primarily on static factors—such as warrants in the past four years, drug convictions in the last nine years and misdemeanor convictions in the last year. Again, we believe that over-policed communities will disproportionately be scored high risk by the RAI. Over-policing means that poor communities of color are overrepresented in the data set, with more frequent contact with the criminal justice system.

The only factor that is not static is the "report fulltime activity" factor. Again, for someone who is unemployed or not in school, the tool suggests they are higher risk and it may make them ineligible for release to the programming and destined for Rikers Island—a particular concerns for the residents of the City plagued by high unemployment and low-rates of high school or college attendance.

***

DNA Analysis and Wrongful Convictions

Year after year we learn that innocent people have spent decades in jail based on faulty hair comparisons, bite mark analyses, and arson investigations—what history has now shown to be junk science. Courtroom have proven ill-equipped to stand guard against bad forensic sciences, and there is little public or scientific oversight that regulates their use. This bill provides much needed

accountability in the absence of more robust regulation from courts or the scientific community itself. Its adoption will act as a barrier to wrongful convictions, and will help ensure the fair and impartial administration of justice in New York City.

The DNA Unit of The Legal Aid Society has noted with concern the increased the increased use of closed-source, proprietary software based on complex algorithms in DNA interpretation. The Legal Aid Society established a DNA Unit in 2013 in an effort to train lawyers in the use of DNA evidence and to challenge the use of experimental and potentially scientifically unsound DNA interpretation techniques in the courtroom. Attorneys in the DNA Unit won the only *Frye* hearing in the country to preclude the use of an algorithm-based DNA interpretation software: the new York City Office of the Chief Medical Examiner's (OCME) Forensic Statistical Tool.

FST is a 'probabilistic genotyping program.' It is designed to interpret complex DNA mixtures that would otherwise be uninterpretable. In practice, an OCME analyst would put into a report or testify as to FST results supporting the inclusion of a suspect in a DNA mixture. However, the analysts issuing the reports or testifying on the witness stand had no idea how the FST calculations were actually performed. There was no way to verify the soundness of FST's conclusions.

The defense bar repeatedly sought the FST source code in order to consult with an expert regarding how the FST performs its mysterious calculations. In state court, we lost every time to the city prosecutors and OCME who vociferously opposed our efforts to obtain this code. The finer details on how FST operated remained in the dark.

Last year, Judge Valerie Caproni ordered the OCME to turn over their source code to the Federal Defenders of New York. The OCME has used FST on cases since 2011. The Federal Defenders were the first organization in over five years to get its hands on FST's instructions. They hired an expert named Nathaniel Adams from Forensic Bioinformatics to review the source code.

Adams found that FST was performing calculations differently than OCME described in court, differently from what OCME described to the New York State Commission on Forensic Science and differently from what OCME described in their two scientific journal publications. However, Adams was prevented by a court order from revealing the specifics of what he saw in the code.

At this point, FST had been used on thousands of cases. People plead guilty based on FST results. People lost at trial based on FST results. People went to prison because of FST. We renewed our fight in state court to obtain the source code to FST. We needed to know how bad the problem was. OCME and the New York City prosecutors continued to fight against us in court. However, OCME

employees admitted that there was an error in the FST code, albeit a different one than described by Adams, and that the FST code had been changed.

Along with the Federal Defenders we filed a complaint to the New York Inspector General asking for an investigation into the changes to FST, among other concerns. The New York Times and even international press agencies reported on this story.[9] It was not until the press became involved that OCME agreed to allow FST, a product made with tax payer money, become transparent by releasing its source code. We are hopeful that the entire code will be released and all versions of FST will be available so that we can have it examined to determine whether it reliably implemented OCME's models.

As of early 2017, FST was being phased out and replaced with a commercial program to interpret DNA mixtures called STRmix. Unfortunately, STRmix is also closed source and has itself had two verified coding errors that resulted in miscalculations.[10] The problem with closed source is not limited to searching for errors. It has to do with subjectivity. Different DNA mixture interpretation software programs are getting different answers in the same case. As one of the

---

[9] https://mobile.nytimes.com/2017/09/04/nyregion/dna-analysis-evidence-new-york-disputed-techniques.html?referer=https://www.google.com/

[10] R. v. Pfennig, SASC 171, 62-63 (Sup. Ct. S. Australia, 2016) https://johnbuckleton.files.wordpress.com/2016/08/r-v-pfennig-judgement-11-nov-2016.pdf

STRmix designers stated, these programs "contain elements of subjectivity programmed into them."[11]

One of the few scientific studies performed to compare different DNA interpretation software programs found startling results.[12] The study used three different probabilistic genotyping programs to analyze five crime scene DNA samples. For one sample, two of the three programs calculated inconclusive likelihood ratios of 1.20 and 1.29. The third program, however, reported an inclusionary statistic of 109 trillion. For a second set of samples, two programs again reported exclusionary likelihood ratios in the hundreds – arguably in an inconclusive range. The third program, however, reported an inclusionary likelihood ratio in the hundred millions. For a third item, all three programs reported inclusionary likelihood ratios: 900 million, 1 billion or 5 hundred quintillion. The greatest likelihood ratio was a trillion times larger than the smallest likelihood ratio.

One of STRmix's first cases in the United States involved a homicide in upstate New York. The prosecution sent a DNA mixture to be analyzed using a program called TrueAllele. TrueAllele reported that there was no statistical support for including the suspect. The prosecutor in that case then requested the sample be reanalyzed by STRmix and, depending on how its settings were set, got

---

[11] https://johnbuckleton.files.wordpress.com/2016/09/dna-evidence-in-ny-v-oral-hillary-i2.pdf

[12] Paolo Garofano, *et al., An alternative application of the consensus method to DNA typing interpretation for Low Template-DNA mixtures*, Forensic Science International: Genetics Supplement Series 5 (2015) 422-424.

an inclusion. Ultimately, the accused had the benefit of a defense team well versed in DNA issues. Fortunately, the STRmix results were precluded—an unlikely outcome for many presumptively innocent individuals faced with problematic forensic science.

Leading scientists have raised the alarm about these probabilistic genotyping programs. Two researchers at the National Institute of Standards and Technology published a paper just last week arguing that the use of probabilistic genotyping programs in the interpretation of complex DNA mixtures "risks allowing personal preference to creep into expert testimony and potentially distorts evidence for a jury."[13]

In 2016, a report published by the President's Council of Advisors on Science and Technology concluded that the forensic science community had yet to establish the scientific validity of these probabilistic genotyping methods or the reliability of the software. They noted in particular that results differed depending on the type of software being used.[14]

And yet, this software has already been used in thousands of cases in New York City and will be used in every DNA case in the future at the OCME. The only way for this city to ensure that questionable forensic science stay out of our

---

[13] https://www.nist.gov/news-events/news/2017/10/nist-experts-urge-cautiob-use -courtroom-evidence-presentation-method

[14] https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf

courts is to require all city agencies to use open source forensic software. This should be a procurement requirement. Science must be open to scrutiny. If is not, the city will be welcoming more wrongful convictions within the five boroughs.

***

Predictive Policing

For the same reasons we know risk assessments do not successfully predict future re-arrest or flight, they do not work to predict future crime trends. We do not live in "Minority Report", and police-created data should only be analyzed to tell us about police practices, not community behavior. At greatest risk of abuse by predictive policing algorithms are communities of color, who have been the long target of disproportionate stop and frisk policing tactics, and have long been over-policed.

An excellent study of the problems with predictive policing was done by the Human Rights Data Analysis Group.[15] This group compared a public health data on drug use with data for drug arrests created by the Oakland Police Department. The police data showed that drug use was concentrated in a few already heavily policed neighborhoods, while the public health data showed drug use to be widespread and equivalent across races. The study simulated the effects of using

[15] Lum, Kristian, and William Isaac. "To Predict and Serve?" Significance 13, no. 5 (October 2016): 14–19. doi:10.1111/j.1740-9713.2016.00960.x.

police data with the popular PredPol predictive policing algorithm.[16] They found that the software increased the disproportionate allocation of officers to poor and minority communities of color. Specifically, the use of predictive policing would increase the targeting of black individuals to twice the rate of white individuals and concentrate police in low-income communities. Research conducted by Bernard Harcourt found similar effects and highlighted the detrimental collateral consequences that occur when police target specific communities."[17]

Pilot programs of predictive policing have also been proven to be ineffective. Predictive policing software was used in to create a "Strategic Subjects List" of individuals allegedly at a higher risk of gun violence. Results actually found that these individuals were not, in fact, at a higher risk for gun violence. Instead, being put on the list increased their chances of being arrested for a shooting due to the increased police surveillance.[18]

Another predictive policing pilot in Chicago found that the program had no reduction in crime and the software functioned essentially as hot spot maps.[19] Specified studies as well as aggregated reports prove time and again that predictive

---

[16] Id.
[17] Bernard E. Harcourt, "Against Prediction: Sentencing, Policing, and Punishing in an Actuarial Age," p. 28 (2005)
[18] Jessica Saunders, Priscillia Hunt, and John S. Hollywood, "Predictions Put into Practice: A Quasi-Experimental Evaluation of Chicago's Predictive Policing Pilot," Journal of Experimental Criminology 12, no. 3 (September 1, 2016).
[19] Hunt, Priscilla, Jessica M. Saunders, and John S. Hollywood, "Evaluation of the Shreveport Predictive Policing Experiment," Santa Monica, CA: RAND Corporation (2014).

policing tools reveal more about policing practices and their disproportionate effect on communities of color instead of actual crime rates.

The disproportionate use of policing against communities of color results in families being broken down, communities being disrupted, employment and education pursuits being halted. It creates a self-fulfilling prophecy by lending credence to the exaggerated myth and stereotype among law enforcement officers of the criminality of the targeted group.

***

Juvenile Representation Project—Delinquency Proceedings in Family Court

There are multiple algorithms being used to assess children in juvenile delinquency proceedings that span from the very beginning of the case to its final phases. Each raises separate concerns, but all would benefit from additional oversight and transparency. Approximately 90% of petitioned children in family court are either black or Hispanic.[20] They are also predominately male. Algorithms that have not been properly vetted or validated risk disproportionately over-classifying these populations as higher-risk than their white counterparts.

These algorithms take the form of RAIs—the first is completed by probation and attached to the delinquency petition. The RAI was developed by the Vera Institute for Justice specifically for use in New York City, and it is used at the

[20] https://storage.googleapis.com/vera-web-assets/downloads/Publications/juvenile-detention-reform-in-new-york-city-measuring-risk-through-research/legacy_downloads/RAI-report-v7.pdf

initial appearance to determine if the child is low/med/high risk under the statutory criteria—which permit consideration of risk of re-arrest and likelihood of failure to appear.[21]

Problematically, one of the factors that increases risk is less than 30% school attendance—a likely proxy for poverty. This factor was not initially included in the construction of the tool because, while a strong high school attendance record did indicate a decrease in risk generally, low rates of school attendance had no real correlation to either of the statutory criteria in the statute. Instead, various institutional players who felt strongly about including this factor made a policy choice. Vera has also noted that push back from decision makers has required them to amend the RAI to include charge severity—something that data scientists initially left out of the tools construction.[22] Consequently, the instrument is flawed, and the assessment of risk level is not as accurate as it should be. Mandated transparency and rigorous oversight would hopefully correct such flaws.

Additionally, when preparing the investigation and report for disposition, probation uses a proprietary algorithm that was developed by a for-profit company called the Youth Level Service/Case Management Inventory tool (YLS/CMI). The instrument is used to assess risks and needs, and relies heavily on client interviews and subjective criteria. For example, the tool includes several categories for

[21] Id.
[22] Id.

"leisure and recreation" and "attitudes and orientation."[23] The manual, data, scoring and weights for the tool are not readily available, and we are not aware of any third party or independent research on the efficacy of the tool. Needless to say, the tool has proven to be tool has proved to be less than reliable given the large amount of subjective criteria involved in the assessment process.

There are three other risk assessments in use. First, when placement is recommended by probation, a "Placement Recommendation Tool" is used. This often delays the commencement of placement even when there is agreement among all parties and the court as to the level of placement that will be ordered. Additionally, it is unclear whether the enumerated factors are based upon research as to what the appropriate level of placement should be. Second, sometimes the prosecutors will also seek a specific risk assessment for children found to have committed sex offenses. Third, if a cases involving fire-setting, sometimes the Fire Marshall is asked to conduct a risk assessment. This is not frequent, and more investigation is needed.

***

Parole and Probation: COMPAS in New York

The COMPAS RAI is used in a variety of forums in New York. Upstate counties use COMPAS as part of their pre-sentence investigations, and DOCCS

[23] https://ardhs.sharepointsite.net/DYSSD/Staff%20Development%20Materials/YLS%20TOT%20resources/YLS-CMI%20training%20powerpoint.ppt

uses COMPAS for parole hearings. The City Council should be concerned given the large number of New York City resident's serving time in upstate correctional facilities and may have parole outcomes dictated by the tool's use.

The problems with COMPAS are best detailed in ProPublica's widely read and well-researched piece "Machine Bias."[24] As previously mentioned in this testimony, COMPAS has not released its data or any proprietary information so that the tool can be independently verified. These concerns can be understood best by reading the *Loomis* decision from Wisconsin.

Of additional concern to Legal Aid is the tools reliance on subjective questioning that likely acts as a proxy for racial discrimination. For example, the tool asks such questions as "was one of your parents ever sent to jail?", "how often did you fight at school?" and "does a hungry person have the right to steal?"

***

The Sex Offender Registration Act RAI

Any individual convicted of an eligible offense under the Sex Offender Registration Act is subject to scoring by the SORA RAI. The RAI is junk science, and has been widely criticized—most notably by Manhattan Supreme Court Justice Daniel Convisor in *People v. McFarland*, 958 N.Y.S. 2d 309 (2010). Convisor notes that the RAI is not valid, has never been validated, and "is simply arbitrary."

[24] https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing

The court also notes that the RAI scoring parameters "can produce patently irrational results." Those seeking more information can find it on the Division of Criminal Justice Services website.[25]

While it is not clear that legislation in New York City can regulate the SORA or COMPAS RAI's, we wanted to provide notice and background that they were being used on vulnerable New York City populations, a concern that the City Council should seek to address in whatever capacity possible.

[25] http://www.criminaljustice.ny.gov/nsor/risk_levels.htm

BRI Building Research & Information (2011) 39(4), 395–411
Routledge
RESEARCH PAPER

Consequences of massive housing destruction: the New York City fire epidemic

Deborah Wallace and Rodrick Wallace

Department of Epidemiology, New York State Psychiatric Institute, 1051 Riverside Drive, Box 47, New York, NY, 10032, US
E-mail: rdwall@ix.netcom.com

What are the social and economic consequences of massive destruction of housing? A case study of the New York City fire epidemic of the 1970s is presented. Decision-makers regarded old neighbourhoods (with low-income families and/or racial minorities) as wastelands and developed policies such as urban renewal and reductions in public services ('planned shrinkage') which negatively impacted on the physical and social fabrics. Structural and functional continuity even after a disturbance – ecological resilience – depends on many non-disjunctive 'loose' relationships to diffuse these impacts. Systems based on 'tight' relationships amplify impacts. Families with resources relocate and reduce the community diversity and the density of loose ties. Low-income families whose homes are destroyed weaken the remaining social networks. The remnant cannot maintain social norms. This displacement leads to two possibilities: many small social networks that do not interact; or one large tight network with low diversity. The former confers pathological resilience; the latter, extreme fragility. Neither enforces social norms or generates political power. Both foster risk behaviours and hamper socialization of youth. Thus, concentrated housing destruction destroys healthy resilience and social control and support. Indirectly, it elevates the mortality rate through increased risk behaviours, high death rates among vulnerable elderly, and infectious and chronic diseases.

Keywords: community stability, housing destruction, neighbourhood social structure, planned shrinkage, public health, public services, resilience, urban life, urban renewal

Quelles sont les conséquences sociales et économiques d'une destruction massive de logements? Il est présenté une étude de cas sur l'épidémie d'incendies des années soixante-dix à New York. Les décisionnaires ont considéré les vieux quartiers (avec leurs familles à faible revenu et/ou leurs minorités raciales) comme des zones à l'abandon et ont développé des politiques telles que la rénovation urbaine et les réductions des services publics («réduction planifiée») qui ont eu des répercussions négatives sur les tissus physiques et sociaux. La continuité structurelle et fonctionnelle, même après une perturbation – la résilience écologique – dépend de nombreuses relations «distendues» non disjonctives permettant de rendre ces répercussions diffuses. Les systèmes basés sur des relations «étroites» amplifient les répercussions. Les familles qui ont les moyens s'installent ailleurs et réduisent la diversité communautaire et la densité des rapports distendus. Les familles à faible revenu dont les habitations sont détruites affaiblissent les tissus sociaux restants. Celles qui restent ne peuvent pas maintenir les normes sociales. Ce déclassement conduit à deux possibilités: de nombreux réseaux sociaux de petite taille qui n'ont pas d'interactions; ou bien un grand réseau aux liens resserrés, mais présentant une faible diversité. Le premier confère une résilience pathologique; le second, une extrême fragilité. Ni l'un, ni l'autre ne renforce les normes sociales, ni ne génère de pouvoir politique. Les deux encouragent les comportements à risque et gênent la socialisation des jeunes. Ainsi, la destruction des habitats concentrés anéantit la résilience saine, ainsi que le contrôle et le soutien sociaux. Indirectement, cela élève le taux de mortalité par l'accroissement des comportements à risque, par l'augmentation des taux de mortalité chez les personnes âgées vulnérables et par les maladies infectieuses et chroniques.

Mots clés: stabilité, communautaire, destruction de logements, structure sociale de proximité, réduction planifiée, santé publique, services publics, résilience, vie urbaine, rénovation urbaine

Building Research & Information ISSN 0961-3218 print/ISSN 1466-4321 online © 2011 Taylor & Francis
http://www.informaworld.com/journals
DOI: 10.1080/09613218.2011.567385

Introduction

The special rapporteur on housing to the United Nations Commission on Human Rights concluded that projects which raze poor and minority neighbourhoods such as Olympics venues, sports arenas, luxury housing, and commercial centres closely resemble ethnic cleansing (United Nations, 1998). The United States has a long history of levelling minority neighbourhoods which came in many forms: pre-Second World War discrimination by the financial industry meant residents of African-American neighbourhoods could not get mortgages and could not obtain loans to maintain their homes ('redlining') (Hillier, 2003); post-war urban renewal, which became known as 'Negro removal' (Schwartz, 1993); planned shrinkage in the 1970s targeted poor, racially segregated neighbourhoods for extreme reductions in housing-preservation municipal services; and currently a variety of forms of gentrification, some of which involve razing old housing. The first three policies depended on close coordination of local and national government.

This paper describes how New York City's (NYC) fire-fighting services were greatly reduced in the 1970s planned shrinkage implementation and the consequences of these reductions with respect to: loss of housing; movements of population; disruption of social, economic and political functions; and deterioration of public health and safety. This narrative is a case history of impacts of rapid and massive housing destruction.

Methods

Over 30 years of research is summarized and used to create a detailed case history of policy-triggered rapid massive housing destruction and its outcomes. A detailed description of the research methods can be found in the authors' published papers and books. However, some background information is necessary. For the studies on fire company closings and their impacts on the adequacy of fire service, a simple mapping was made of such phenomena as where the fire companies were closed, neighbourhoods where building fires clustered over time, neighbourhood loss of housing units and neighbourhood loss of population. Fire clustering was graphed over time within neighbourhoods. The use of indices such as an annual index of fire damage graphed against year and the index of underservice compared among neighbourhoods illustrated the impacts of fire service cuts. The application of ecosystem analytical approaches included Lloyd's Index of Patchiness to quantify fire clumping (a measure of contagion) and the Broken Stick model to quantify competition between neighbourhoods for fire services. Simple regressions revealed such associations as the relationship between annual neighbourhood fire engine worktime and the annual neighbourhood number of transfers of public school students, as an the index of migration within and between communities.

Besides large quantities of fire department data on service cuts, the number of fires, firefighting worktime, fire fatalities, the number of firefighting units sent to individual fires and fire fighter injuries, the authors amassed large quantities of social, economic and public health data: US Census data by neighbourhood on population, educational attainment, extreme housing overcrowding, the number and condition of housing units, median income, poverty rate, racial composition, migrations out of NYC, and employment/unemployment; NYC Department of Health data by neighbourhood on new case incidences of tuberculosis (TB), acquired immune deficiency syndrome (AIDS), measles, and conventional sexually transmitted infections, on homicides, diabetes deaths, deaths from overdoses of illegal drugs, cirrhosis deaths, and on age distributions. Although mathematical models were sometimes developed to illuminate the relationships between housing destruction and social and public health changes, most of the analytical methods remained simple such as mapping new case incidences over time, graphing new TB cases against extreme housing overcrowding, and use of the non-parametric Mann–Whitney test to see if the number of group fire fatalities was greater in years after the reductions in ladder companies (which have the specific functions of rescuing people in a fire: performing forcible entry to the fire, ventilation and the life-saving removal of trapped people) than in previous years. As with the analyses of impacts of the cuts on the fire service itself, analytical techniques were harnessed from ecosystem science. In particular, Ives's method of measuring the potential for amplification of impact was modified to reflect a neighbourhood's resilience. For a full description of the modified Ives's amplification factor, see Wallace and Wallace (2000).

Planned shrinkage of fire service in New York City: a case history

The dynamics of planned shrinkage in NYC is the focus of this study. The policy was first applied during President Richard Nixon's first term (1969–1973) nationally and the NYC Mayor John Lindsay's Administration (late 1960s–mid 1970s) locally. Subsequent mayors continued that policy so that the city was subjected to municipal service withdrawals from poor, racially segregated neighbourhoods from about 1969 to the present, although the most intense period of these service withdrawals was during the 1970s when 10% of the fire control units were disbanded, nearly all from neighbourhoods of old, overcrowded housing with maximum hazard of building-to-building

Building Research & Information 2011;39:395–411.

spread of fire. For details of the fire service cuts, see Wallace and Wallace (1998a), summarized below.

The Lindsay Administration and the Rand Corporation created an entity, The New York City-Rand Institute, contracted by NYC ostensibly to analyse city agencies and recommend policies for greater efficiency. The Institute was not a direct governmental agency itself and, thus, not accountable either to the citizens or to their elected representatives on the City Council, as are the mayoral agencies. The NYC-Rand Institute developed the policies that greatly reduced firefighting resources citywide and especially targeted poor, racially segregated neighbourhoods.

Before overtly closing fire stations, NYC-Rand gave the Fire Department new ways of reducing responses to alarms in targeted neighbourhoods. Under the guise of reducing responses to false alarms, the number of firefighting units (engines and ladders) responding to alarms was reduced to those from street alarm boxes with relatively high numbers of false alarms. Indeed, during some times of the day, only one engine would be sent to such an alarm. At that time, standard response to alarms was three engines, two ladders and a battalion chief. However, these same fire alarm boxes were in high fire-incidence neighbourhoods and also had high rates of real alarms. Additionally, NYC-Rand recommended the installation of what are essentially electronic telephones in place of the old reliable mechanical alarm boxes, but designed to use the same ageing cable system for voice transmission. The person reporting a fire on one of these has to hold a detailed conversation with the fire dispatcher before firefighting units are sent to the fire. This is problematic in a city where many residents do not speak either English or Spanish and where street noise is so great that hearing the dispatcher's questions often is impossible. The emergency response system (ERS) boxes are wired in series so that if someone is using a box on the circuit, none of the other boxes can be used. Great unnecessary fire damage and even several fire deaths have been traced to either 'adaptive response' (the sending of fewer than a standard number of units to an alarm) and to problems with the ERS boxes. In 1976 during the pre-Christmas holiday shopping period, more than ten people died in a fire in a Fulton Street, Brooklyn, store. The person trying to report the fire did not recognize the ERS boxes as alarm boxes and ran searching for an old-fashioned mechanical box. Some of the deaths were attributed to the delay in alerting the fire service.

When the reductions in the number of firefighting units occurred, beginning in 1972, the reduced service to poor, densely packed neighbourhoods of old overcrowded housing was already manifest. Table 1 lists the fire company cuts for 1972–1991. Further cuts

Table 1 Fire company closings, 1972–1991

Borough	Neighbourhood	Number of removed companies
Manhattan	Lower East Side[a]	4
	Lower West Side	3 (2 restored)
	Times Square[a]	1
	Upper West Side	2
	Harlem[a]	3
Brooklyn	Brownsville[a]	6
	Bedford-Stuyvesant[a]	2
	Crown Heights North[a]	1
	Greenpoint	2 (1 restored)
	Park Slope	2 (1 restored)
	Red Hook[a]	1
	Brooklyn Heights	1
Bronx South	Bronx[a]	7 (1 restored)
	City Island	1 (restored)
Queens	Flushing	1
	Richmond Hills[a]	1
	Rockaway[a]	2
Staten Island	Stapleton[a]	1
	Tottenville	1

Notes: [a]Neighbourhood majority population non-Caucasian and poor. [b]The unit was closed and reopened twice.

were made in 2004. This later cut involved smaller numbers than those in the 1970s, when typically over a dozen firefighting units would be removed from poor neighbourhoods either by moving to wealthier neighbourhoods or by elimination entirely.

Building fires in NYC had been escalating since the 1960s as the population increased in poor neighbourhoods and as the housing aged. Programmes that improved fire-prevention education and enforcement and that increased firefighting companies in these neighbourhoods led to great reductions in fire damage. The companies that were opened for this purpose were the first to be removed under the NYC-Rand recommendations. Figure 1 shows an annual index of fire damage based on the number of serious fires, the number of structural fires and the hours of firefighting worktime. Companies were opened in poor neighbourhoods in 1968–1969, and fire damage began declining. The companies were closed in the 1970s, and the damage index rose to a peak, assuming the shape of a 'bound's tooth' (*i.e.* a curve that rises to a peak and declines precipitously), similar to the peaking of an epidemic of contagious disease.

Building Research & Information 2011;39:395–411.

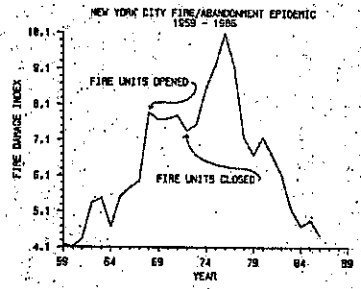

Figure 1 Index of fire damage versus year. This index is based on the hours of firefighting worktime, the number of structural fires and the number of serious fires

NYC-Rand's Fire Project based its recommendations for fire company closings on mathematical models of fire company response time. These models rested primarily on the Euclidian distance between the firehouse and the various street alarm boxes. The first model in use, the Resource Allocation Model, divided the city into regions of seven hazard levels and aimed to equalize response times between regions of similar hazard level. In fact, neighbourhoods of widely differing real hazard of fire incidence and of spread potential were merged into single regions so that the neighbourhood with a true high hazard would suffer greatly, but the abutting middle-class one would not. The Resource Allocation Model was the only one in use for the 1972 and 1974 rounds of cuts. In 1975 and thereafter, both the Resource Allocation Model and the Firehouse Siting Model were applied to identify companies to be closed. The Firehouse Siting Model would identify the particular company to be closed in the region of lower response time than others in its hazard class. These models are described in detail by Wallace and Wallace (1998a, ch. 2). Table 2 lists some of the assumptions on which the models depend; Table 3 lists the local variables omitted from the models; and Table 4 describes the policy changes that increased fire size or alarm rate in 1972–1976. The models were structured to ensure that neighbourhoods with the highest density of fire companies would lose them. This density had developed historically to serve the high population densities and overcrowded, ageing housing. The tables demonstrate that these models were completely inadequate for designing a system on which lives and homes depend.

The fire service cuts and other policies that radically reduced fire control services to poor, racially segregated communities were not just a matter of saving money. They were part of a policy known as 'planned shrinkage', a local implementation of Daniel

Table 2 Model assumptions versus reality

Assumption 1: Unchanging ratios of types of alarms	
Reality:	Rapid changes both citywide and within areas. Physical and social instability leads to rapid changes
Models:	Resource Allocation Model
Assumption 2: Predictable alarm rates	
Reality:	Rates highly variable from year to year
Models:	Resource Allocation Model
Assumption 3: Service times independent of each other and of the state of the system	
Reality:	Many factors increase service times: servicing of alien areas, firefighter exhaustion, dispatching delays during peak periods
Models:	Resource Allocation Model
Assumption 4: Availability of units is stable	
Reality:	Massive changes in availability with cuts and with unstable alarm rates
Models:	Resource Allocation Model and Firehouse Siting Model
Assumption 5: Very low probability of all units busy in an area	
Reality:	Even borough-wide unavailability (all busy) sporadically since April 1975
Models:	Resource Allocation Model and Firehouse Siting Model
Assumption 6: All alarms are answered from the firehouse	
Reality:	Alarms are regularly answered from the field, especially during peaks in high-alarm areas
Models:	Resource Allocation Model and Firehouse Siting Model

Patrick Moynihan's 'Benign Neglect' policy. Moynihan was President Nixon's advisor and policy-maker on urban affairs. 'Benign Neglect' called for ignoring the calls for help from poor African-American communities, segregating them and disempowering them (*New York Times*, 1970). Moynihan engaged in a correspondence with the NYC-Rand Fire Project engineers. Indeed, parts of his famous 1970 'Benign Neglect' memo were furnished by these engineers and reveal a misuse of fire statistics: all fire alerts were labelled arson, and Moynihan, in the memo, called fire alerts a leading indicator of community pathology. 'Planned shrinkage' labelled these neighbourhoods as dying and recommended a fringe that withdrew essential services to them so that healthy neighbourhoods (*i.e.* white and middle-class) could enjoy increased services without an increase in the municipal budget. 'Planned shrinkage' filled the role that urban renewal had filled before urban renewal (also known as 'Negro removal') became political poison and a subject of sermons from pulpits around the city. For details on the discriminatory aspects of the fire service cuts, see Wallace and Wallace (1998a, ch. 2).

The neighbourhood residents tried to protect their fire companies and demanded meetings with Fire Department officials. The Fire Department Planning and Operations personnel and their co-workers from

Building Research & Information 2011;39:395–411.

Table 3 Local variables omitted from the NYC-Rand models

1. Potential for fires to spread between buildings
2. Hydrant pressure and maintenance
3. Design of streets
4. Parking customs (double-parking, parking at hydrants)
5. Presence of special hazards (natural gas tanks, pipelines, etc.)
6. Variable traffic patterns
7. Arson rate
8. Age structure of the population: the old and children are especially susceptible to fire-injury and death
9. Special seasonal fire characteristics such as brush fires and the use of heaters and stoves in areas of many heating violations
10. Access to means of turning in alarms reliably
11. Population density and changes therein
12. Spatial and temporal patterns of fire occurrence on the neighbourhood level, e.g. Harlem and the affluent Upper West Side were lumped into a single 'hazard region'

Workload policies confounding the models

1. In busy areas, the nearest fire company was not always the one dispatched to the alarm. A less busy one may have been sent
2. Companies are given a two-hour rest after a big fire or after many small ones
3. 'Interchange' exchanged busy with less busy companies to even out the workload. The lack of familiarity with the busy area degraded service
4. In the mid-1970s, relocation occurred mainly between ghettos. Relocation sends a company into another company's service area if that service area has all units out working

Table 4 Policy changes that increased size of fires or alarm rates, 1972–1976

1. Closing or moving fire companies from high fire-incidence areas
2. No voice contact on emergency response system (ERS) boxes gets at most one engine response
3. 1972–1974: less than standard responses to ghetto alarms
4. Staffing reduction: five to four on engines, six to five on ladders
5. Reliance on firefighters tired from mandatory overtime
6. Understaffing in dispatch centres delays the response
7. 1974: reduction by one engine in the standard response
8. Dispatchers and battalion chiefs cannot longer call automatic higher alarms but are pressured to 'special call' units one by one
9. Cuts in trash collection lead to more trash fires
10. Cuts in building inspections lead to more fire violations left unremedied
11. Understaffing of fire marshals hampers arson investigations
12. No more inspection for repair of fire damage contributes to building abandonment
13. Cuts in hydrant inspection and repair increase the percentage of defective hydrants

the NYC-Rand Institute would arrive at these meetings with lots of charts, graphs and equations, all 'proving' that closing these fire companies would have no impact on fire service. The residents, not having technical training, could not answer this barrage of pseudoscience. Indeed, they could not recognize it as pseudoscience. They were silenced and disempowered; it was an egregious example of technocracy.

In a sense, the proof was in the pudding. The neighbourhoods that lost much of their fire service lost immense proportions of their housing and were all poor and African-American, Latino or a mix of the two. Figure 2 shows the housing and population losses of the Bronx borough of NYC. Some neighbourhoods on the maps lost over 50% of both their housing and their populations between 1970 and 1980. Such losses also occurred in Harlem, East Harlem, the Lower East Side, Brownsville, Bushwick, East New York and other similar neighbourhoods.

By April 1975, an unprecedented event began occurring on a regular basis: all firefighting units in a borough would be out responding to a fire and no reserve was left in case of further fire alerts. Fire companies would have to be pulled from other boroughs, reducing fire protection in the donor boroughs. Although the first borough in which this complete spending of protection occurred was Brooklyn, it also happened in the Bronx and Manhattan. By 1976, the Fire Department tried to keep reserves by simply truncating service further to the high fire-incidence neighbourhoods. The relocation function, the sending of outlying companies to neighbourhoods whose own companies were all busy, was grossly scaled back. Alarms were inadequately answered with too few companies. Tired firefighters were not relieved. In other words, the fires were allowed to burn and cause much more damage than they would have if full relocation had proceeded. When the relocation time is graphed against total fires

Building Research & Information 2011;39:395–411.

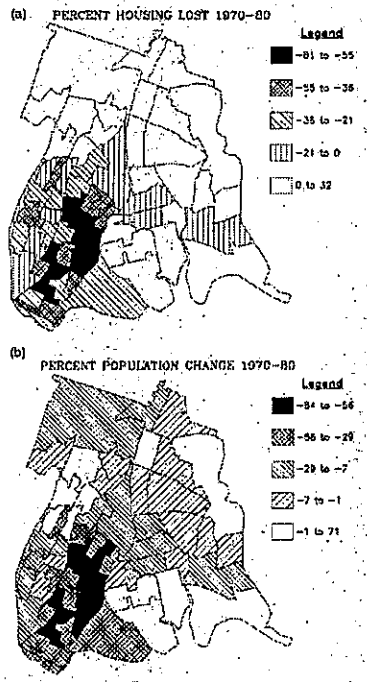

Figure 2 Housing and population losses of Bronx health areas, 1970–1980: (a) per cent loss of housing in the Bronx health areas; and (b) per cent loss of the population

for the engine companies by year, the authors found that, by 1976, the curve flattened to an asymptote so that the busiest companies received less and less outside support per unit number of fires. This truncation continued over the years after 1976.

The removal of fire protection from old, overcrowded neighbourhoods was predictable. The number and size of fires in a neighbourhood depends on the per cent of extremely overcrowded housing units (more than 1.5 persons per room) (Wallace and Wallace, 1984). But the fires do not occur evenly in time. They peak according to season, day of the week and time of day. Ironically, these graphs of fires per hour by season, day of week and time of day were generated by the NYC-Rand Institute. Thus, the analysts and the Fire Department planners knew that, during peak period, the fire calls arise much more frequently, and more fire companies are sent out than would be indicated by annual average fire call rate or even seasonal average rate. In the context of the large reductions in the number of fire companies specifically in high fire-incidence areas, activation of all companies at a time across a deeply affected borough was predictable.

Immense amounts of fire damage, as a consequence of delayed and/or inadequate response to fire calls, were also predictable. All these issues had been publicly discussed in the late 1960s when new fire companies were opened in the high fire-incidence areas to cap the rising damage. The companies were opened as a result of labour arbitration before the Public Employees Relations Board of New York State.

Between 1970 and 1980, 250 000–300 000 housing units were lost to the twin epidemics of fire and landlord abandonment (Sternman, 1981). Landlord abandonment was synergistic with the fire epidemic. Other researchers have studied abandonment in other cities and found that it, like fire, is contagious and forms a parasite on the housing stock. Michael Dear analysed its geography over time in Philadelphia (Pennsylvania) (Dear, 1976), and John Odland and co-workers examined Indianapolis (Indiana) patterns of building abandonment (Odland and Balzer, 1979).

In NYC, the typical scenario during the 1970s was that a large fire would mark a block with visible damage. After an 'incubation' period of a few months, several fires would occur. The landlords would stop maintaining the buildings in preparation for abandonment. More fires would occur due to the lack of maintenance. Most of the buildings on the block would become destroyed and/or deserted. This process would occur over the course of less than a year in hard-hit areas. For example, the authors mapped all the building fires in Bushwick, Brooklyn, by month for 1976–1978. This indicated that the fire epidemic could be followed by plotting the number of fires that occurred in cluster of five on a single block in a single month against month. The contagion of the clustering on the maps is clearly evident as is when the clustering spread from one part of the community to another, not just from block to block (Wallace and Wallace, 1983). The processes of fire and abandonment also spread between blocks. Large stretches of targeted neighbourhoods would become wastelands with only a few occupied, functioning buildings by the end of a couple years in the face of a rolling front of destruction.

The destruction occurred in a contagious pattern: highly concentrated foci from which the rolling fronts migrated across the cityscape. Indeed, the analytical mathematics for describing disease and parasite epidemics could be used on the building-and-

Building Research & Information 2011.39:395–411.

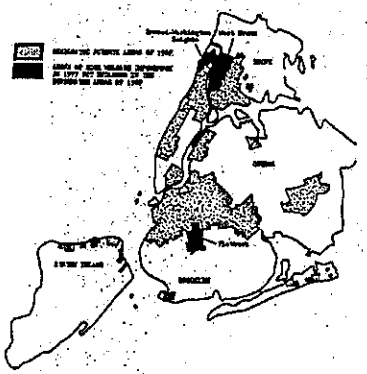

Figure 3 Migration of welfare population/poor people from the 1967 designated high-welfare zones to adjacent areas by 1977

Figure 4 School transfers in the 1974/1975 school year

fire system, with the buildings as the hosts and the fire as the pathogen (Wallace and Wallace, 1983). The underlying mechanism for this dynamic is still unknown. What is known is that arson does not play a role until near the end of the process because the causes of the fires in several affected neighbourhoods were examined over the course of their fire epidemics. Repeated arson did not arise until after the epidemic peak. This was largely a phenomenon of vacant buildings or those abandoned by landlords. Indeed, it was never found that a majority of building fires in any month in any of the neighbourhoods were caused by arson. This finding is contrary to the NYC-Rand Institute's and Moynihan's labelling of all fire alarms as 'arson'.

Consequences of housing destruction

According to the US Census Bureau, about 1.3 million white people left New York between 1970 and 1980. From interviews with such community leaders as Reverend Carl Butz of the famous Abyssinian Baptist Church in Harlem, the authors conclude that large numbers of middle-class African-Americans and Latinos also moved out. The membership of Abyssinian plummeted from 20 000 in 1970 down to about 5000 in the early 1980s. By 1980, the population of NYC was a bit below 7 million (down from about 7.8 million) and would have been even lower if not for foreign immigration.

Within the city, about 600 000 poor people migrated between neighbourhoods. The schools were in turmoil because of the massive transfer of students. These transfers were highly associated with the fires because the R^2 value of regressing fire engine worktime against schools transfers for the 1970s is over 0.9 (Wallace and Wallace, 1998a, p. 70)! Previously middle-class neighbourhoods received so many families on public assistance that these neighbourhoods were reclassified as high-welfare neighbourhoods. Figure 3 shows the migration of the welfare population. Figure 4 shows the school transfers for the mid-1970s. Figure 5 shows the migration of the black population between 1970 and 1980 within the city.

Only the emigration of the middle-class kept housing overcrowding to low levels. By 1980, high mortgage rates put a stop to the emigration, and housing overcrowding soared. By 1990, a higher percentage of the city's housing was extremely overcrowded than in 1970 when the overcrowding formed part of the backcloth of the 1970s' fire epidemic. The crisis in low-cost housing availability and the resulting overcrowding and doubling up of families had multiple impacts on public health and in generating homelessness.

In summary, the 'planned shrinkage' of the NYC Fire Department resulted in a contagion of building fires and accelerated the contagion of landlord abandonment of buildings. A true epidemic of housing loss occurred, highly concentrated in poor neighbourhoods.

Building Research & Information 2011.39:395–411.

Figure 5 Migration of the black population: each shaded area consists of many census tracts; each census tract in the shaded area either lost or gained 2500 or more African-Americans, 1970–1980

This rapid loss of housing forced a mass migration into adjacent neighbourhoods with the resulting social disruption occurring in both the sending and the receiving neighbourhoods. Besides housing overcrowding, public health and public order suffered from immense multifactorial disruption in large numbers of neighbourhoods. The consequences that occurred are discussed below.

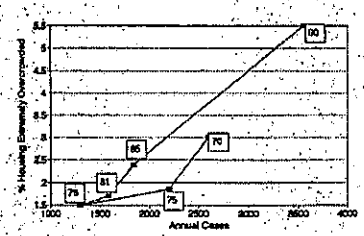

Figure 6 Tuberculosis (TB) cases citywide versus the Index of Extreme Housing Overcrowding
Numbers in boxes indicate the year (70 = 1970, etc). 1978 was the year of minimal number of TB cases in this set of years (1970–1990).

TB outbreaks occur in developed countries only in circumstances of extreme disruption and public suffering such as warfare and disaster (Youmans, 1979, p. 359). TB flared up in NYC, beginning in 1979 when the percentage of extreme housing overcrowding rose from its historical low in 1978. Figure 6 shows the relationship between citywide extreme housing overcrowding and the number of cases of TB. Extreme housing overcrowding fosters rapid transmission of TB within households. A study of new TB cases arising in children under age five showed that the households of these cases had an average of about two persons per room (Drucker *et al.*, 1994). The TB resurgence eventually affected most neighbourhoods of the city. Most neighbourhoods in 1990 had a higher incidence of TB than in 1978 (Wallace, 1994) (Figure 7). The resurgence slowed in 1993 and annual incidence began to decline again.

TB has an especially tragic synergism with the human immunodeficiency virus (HIV). HIV, of course, facilitates TB infection and progression to active disease because it destroys cellular immunity. However, TB facilitates infection with HIV and progression to AIDS because TB infection compromises the immune system in its efforts to isolate the bacterium and keep it from progressing. In biological terms, this encasement is energetically expensive and requires much of the resources of the immune system.

AIDS was described as a definable disease in 1981, just as the full delayed impact of the 1970s' building destruction flowered. HIV is transmitted largely through the risk behaviours of unprotected sex and sharing of drug-injecting apparatus. In the wake of destruction of the social and political aspects of community, such risk behaviours raged uncontrolled. By 1984, AIDS among the populations affected by the housing destruction rose in incidence at a faster rate than it rose among white gay males. Because these populations were now scattered over the Bronx, Brooklyn and Manhattan, AIDS prevention through education was expensive, ineffective and haphazard. Additionally, the forces behind the coping risk behaviours remained in high gear. Thus, drug use and promiscuity accelerated through the 1980s and into the early 1990s, driving the spread of HIV infection and AIDS through both the neighbourhoods with high housing losses and the neighbourhoods that received the refugees (for the Bronx neighbourhoods' AIDS cases, see Figure 8). Public health researchers had long known that drug-taking was a contagious risk behaviour within social networks (Hunt and Chambers, 1976). Researchers specializing in sexually transmitted infections more recently demonstrated that sexual relations within social networks are also

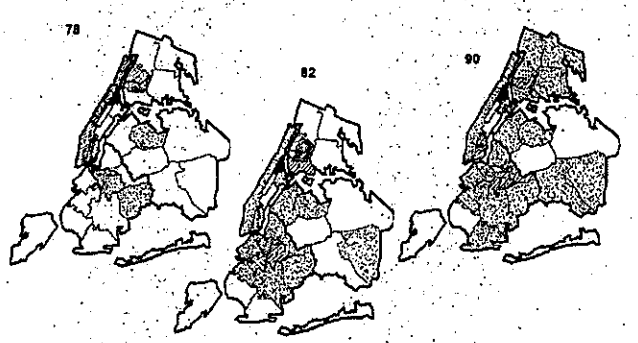

Figure 7 Tuberculosis (TB) spread over time during the 1979–1993 epidemic; 1978 was the year of lowest incidence. The neighbourhood solidly in black is the top-ranked health district for TB incidence: Central Harlem. The striped neighbourhoods are the other members of the top quintile for incidence. The stippled neighbourhoods are those with incidence above the 1978 citywide incidence. By 1990, all health districts of the Bronx had incidences exceeding the 1978 citywide incidence; all those of Brooklyn but one also had such an elevated incidence

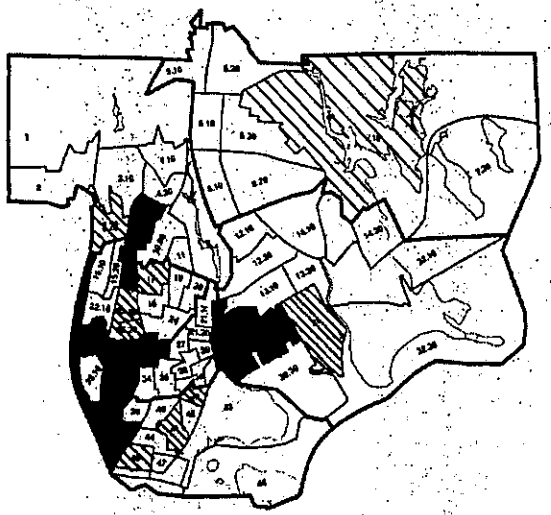

Figure 8 AIDS deaths in the Bronx: cumulative number of deaths in health areas, 1980–1985. Solid areas are the nine highest ranked for the number of deaths; the striped areas are the next nine in rank for the number of deaths. Compare this geography with the maps of housing and population loss and of migration

Building Research & Information 2011 39:395–411

contagious (Rothenberg and Potterat, 1988). Wallace and Wallace (1990) indicate the risk behaviours over time in NYC (gonorrhoea, homicides, drug overdose deaths and suicides) and illustrate the rise of these behaviours after the mid-1970s.

A further important risk behaviour also accelerated in the post-destruction era: violence, especially murders. Figure 9 plots the number of murders by year and requires little further explanation. The drug trade contributed much to these murders, as did youth violence. For details on how housing destruction and its consequential social disruption and isolation of youth led to a wave of youth violence, see Wallace *et al.* (1996). The youth violence rose because of the loss of community control and the lack of youth socialization as well as the inability of young men to achieve identity through constructive means such as employment and academic achievement under the chaotic circumstances.

High rates of violence are associated with high rates of low-weight births. This connection was made in NYC (Wallace and Wallace, 1998b) and another team reached the same conclusion for Baltimore (Maryland) (O'Campo *et al.*, 1997). Low-weight birth increases the risks of major health problems during both childhood and adult life and of cognitive impairments that impede educational achievement and adult

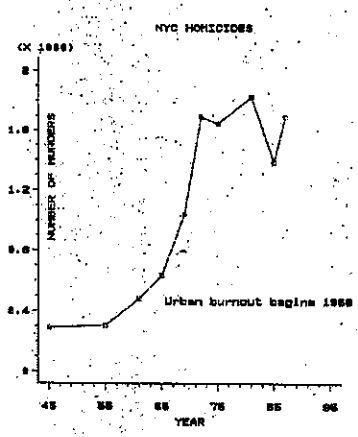

Figure 9 Murders in New York City (NYC) by year. Before the elevation of citywide fire incidence, about 300 murders occurred in NYC per year. After about 1973, this number stabilized at around five times that value at about 1500 per year until 1993. Thus, over 20 000 excess deaths occurred by homicide alone during the time of social upheaval and loss of community efficacy

Building Research & Information 2011 39:395–411

employment. The Baltimore team conducted a survey of new mothers and found that the street violence led to coping risk behaviours such as the use of tobacco, alcohol and drugs. The majority of low-weight births were connected with these risk behaviours (Schempf *et al.*, 2009). However, the present authors studied a cohort of mothers who were chosen for their lack of risk behaviours (all over age 18 with no smoking, little drinking and no drugs). The study found that mothers who themselves were born during the 1970s' wave of housing destruction had babies significantly smaller on average than the other mothers and had a much higher percentage of babies with birth weights below 2500 g, the definition of low-weight birth. So the stresses from the housing destruction and its immediate aftermaths acted both directly and indirectly on the quality of babies born to women in the affected communities. An early study of low-weight births statistically associated the percentage of low-weight births in African-American neighbourhoods with the loss of housing units (Struening *et al.*, 1990). The later studies provided the mechanisms. Low-weight births are a barometer of community stress, especially from violence and homicides.

Chronic insecurity and powerlessness have been associated with fatty, sugary food as a coping risk factor (Rosmond and Björntorp, 1999). All of the United States participates in an epidemic of obesity, but the prevalence is highly heterogeneous. Although the New York metropolitan region does not have published longitudinal data for the prevalence of obesity, there are data on the incidence of diabetes deaths, an indicator of obesity. Diabetes deaths began rising steadily over the entire New York metropolitan region in the late 1980s (Wallace and Wallace, 1998c). Within NYC, these deaths were highly concentrated in the neighbourhoods affected by the 1970s' housing destruction (Wallace *et al.*, 2010, ch. 12). Contributing factors to diabetes include: elevated rates of obesity, acute day-to-day demands on adults which necessitate delay or omission of seeking medical attention, and difficulties in complying with prescribed treatment when medical attention is sought. The simple provision of housing, food, clothing, utilities, etc. is a heroic effort in these broken communities. The NYC Department of Health did not begin serious analysis of obesity and its geography until the late 1990s. The neighbourhoods of high-obesity prevalence were the same as those with high rates of diabetes deaths.

Although diabetes is highly associated with obesity, other chronic diseases also include obesity as a risk factor: asthma, hypertension, coronary heart disease and certain congenital malformations. The publication that triggered attention in the United States to health disparities between races and classes showed that male life expectancy in Harlem was lower than that of Bangladesh (McCord and Freeman, 1990). Indeed,

Building Research & Information 2011 39:395–411.

life expectancy on a citywide basis for both black men and black women over 60 years of age deteriorated between 1970 and 1980 (Wallace and Wallace, 1990), especially for those aged over 70 years. This pattern of deterioration in life expectancy contrasts with the improvement in life expectancy of white men and women over ages 60 and 70 years. Although AIDS and homicide contributed much to McCord and Freeman's finding, the chronic diseases such as hypertension and diabetes struck black men in Harlem at very early ages compared with white men in other neighbourhoods. Living in a targeted neighbourhood aged its inhabitants rapidly. These conditions leading to rapid ageing arose directly and indirectly from the war on the housing stock waged in public policy. The difference between affected and relatively unaffected neighbourhoods with respect to the percentage of the population aged over 65 years in year 2000 is significant. The *t*-test showed a highly significant difference between affected and unaffected neighbourhoods. Examination of age at death by cause illuminates the bases of the difference: residents of affected neighbourhoods were dying of the diseases noted by McCord and Freeman at comparatively early ages. The lowest amount for the affected neighbourhoods was 5.1%; the lowest for the unaffected neighbourhoods, 8.3%. The highest amount for the affected neighbourhoods was 11.5%; the highest for the unaffected, 18.8%. The affected neighbourhoods had an average of 8.5% of the population over 65 years of age; the unaffected, 14.4%. The diseases, conditions and risk behaviours arising from the housing destruction in the affected neighbourhoods led to a decreased life expectancy (Wallace *et al.*, 2010).

Social structure and resilience

Healthy communities have a rich structure of many social networks joined by non-disjunctive 'weak' connections that act across the usual barriers of age, class, ethnicity, religion, etc. Granovetter (1973) called this structure 'the strength of weak ties'. Diversity in ethnicity, economic class, social status, age and interests creates the opportunity for loose ties between these components. Such a structure as this grows up over many decades and develops inter-generationally. It depends on residential stability. Indeed, Sampson *et al.* (1997), in the famous Chicago Project, identified residential stability as a necessary attribute of the efficacious community that achieves common values and can enforce them. Enforcement of common values and support of community components form the 'village' that is needed to socialize the young and bring them into adulthood and into active participation in community life.

The 1970s' housing destruction also destroyed the social, economic and political structure of the affected communities. With the emigration of those with resources, the age structure also shifted so that many neighbourhoods had a very high density of youth under the age of 20 years. The youth formed their own communities, but without the guidance of traditional values. Additionally, there was little opportunity for them to achieve identity through constructive activity. Furthermore, the contempt shown to these neighbourhoods by the local authorities made the youths reject the value system of and any guidance by the authorities. This rejection and need to achieve identity provided the context of the beginning of the era of high levels of youth violence and drug abuse. Once the violence began, it escalated as greater and greater levels of violence were necessary both to achieve identity and to scare off rivals so that each little group could maintain its own safety. The pattern of youth violence resembled that in South Africa during apartheid (Wallace *et al.*, 1996). Indeed, one of the co-authors of Wallace *et al.* (1996), Alan Flisher, is a South African psychiatrist who specializes in youth violence.

Rampant street violence forced neighbourhood residents not to venture outside their homes, a habit that made the streets even more dangerous. Attendance at neighbourhood meetings plummeted, which reduced neighbourhood social and political activity and strength. It also contributed to overweight and obesity as people became more sedentary at home (for a graph of average body mass index of a cohort of reproductive aged women plotted against an index of chronic community stress, see Wallace *et al.*, 2003). In this situation, neighbourhood problems could not be addressed by the residents and simply became chronic conditions. Thus, only little fragments of social structure were left to pursue AIDS prevention, making sure TB patients took their drugs, seeing that children were vaccinated, etc. By 1990, the full cost of the fire and abandonment epidemics of the 1970s was being paid by the residents of NYC. O'Campo *et al.* (1997) found similar dynamics of a loss of social control and a rise of violence and low-weight births in Baltimore, another city heavily impacted by massive housing loss. These papers substantiate Sampson *et al.*'s (1997) requirement of residential stability for community efficacy and control.

A reversal began around 1993: the murders began declining as did TB cases, AIDS cases and teenage pregnancies. Fifteen years were needed between the end of the wave of housing destruction and the beginning of recovery from the outfalls, which is almost a generation. Yet, the neighbourhoods retained social scars. Their social structures did not resemble the pre-destruction ones. The modified Ives amplification calculation was applied to the South Bronx health areas and those in Upper Manhattan to gauge their resilience. In the South Bronx, a pathological resilience

Building Research & Information 2011 39:395–411.

formed such that neither positive interventions nor deleterious impacts had an effect on such indicators as low-weight births and homicide. The South Bronx had at least two major ethnic groups, African-American and Latino, which conferred this pathological stability on it through fragmentation into non-interacting small social networks that were disconnected with mainstream social and political structures. Central Harlem, however, was highly segregated in the 1990s and left with one large dominating, very tight social network. Central Harlem had very little resilience after the 1970s' destruction and reacted to every little change, both good and bad. Thus, economic and social conditions highly influenced such indicators as incidences of low-weight births and homicide (Wallace and Wallace, 2000). What is remarkable about the South Bronx and Harlem is that their rates of low-weight births and homicide are similar, although the South Bronx suffered much greater loss of housing and population than did Harlem. The massive destruction left the South Bronx with many small social networks that do not interact and which confer pathological resilience. Central Harlem's lack of ethnic diversity resulted in a tightening of relationships between social networks until one large network formed. Neither the South Bronx nor Central Harlem functions like a healthy community: one simply fails to react to any impact or improvement and the other is hyper-reactive and brittle (Wallace and Wallace, 2000).

Indications of recovery and of fragility

Fifteen years after the end of the rolling waves of building destruction, public health and public order began to recover. Annually, the number of murders has dropped since 1993 until the lowest number in recent history has been recorded in the past couple of years. Similarly, rates of TB and AIDS have plummeted. The decreases began before the widespread medical interventions of directly observed treatment for TB and of highly active anti-retroviral therapy for AIDS. Certainly these interventions accelerated the decline in these two diseases, but the residential stability allowed by the slowing of housing destruction makes medical interventions more efficient and effective.

Rates of teenage pregnancy and of low-weight births also plummeted in the affected neighbourhoods. Figure 10 shows the health district maps of the percentage of live births that had weights less than 2500 g for around 1990, 1995, 2000, 2005 and 2008. The affected neighbourhoods showed large declines between 1990 and 2000. However, by 2005 some began to deteriorate. Indeed, the number of health districts with more than 8% of live births at low weights increased greatly between 2000 and 2005, even while births to teenagers continued to decline. Increased low-weight births indicate increased unbuffered stress on the populations of these communities. For a review on stress and pregnancy outcomes, see Vrekoussis *et al.* (2010).

The 1990s were a time of great prosperity and low unemployment. By 2001, however, recession became apparent and was accelerated by the attack on the World Trade Center. In the late 2000s, housing became a severe problem with respect to both affordability and availability/retainability in the aftermath of the foreclosure crisis. It appears that the ups and downs of low-weight births hint at a lack of resilience in many NYC neighbourhoods. Indeed, Wallace *et al.* (2007) found that the main difference now between the rich and poor neighbourhoods with respect to resilience and the ability to absorb impacts is that the rich neighbourhoods suffer fewer and less severe impacts because they are buffered by their resources and power. If they do receive impacts, they do not react any better than the poor neighbourhoods. So even the middle-class and upper-middle-class areas were highly disturbed during the 1970s (after all, 1.3 million white people left the city then) and lost the 'weak' ties necessary for resilience.

The recovery appears incomplete and partly based on the 1990s' prosperity.

Repeated waves of housing destruction and community displacement

Incomplete recovery even after a generation since the fire and abandonment epidemics is not a surprise. The fire and abandonment epidemics occurred as only yet another wave of housing destruction and forced migration after a series of previous episodes. For descriptions of the impacts of urban renewal, see Schwartz (1993), which focuses on NYC, and see Fullilove (2005), which examines several American cities. These communities are human ecosystems that have been subjected to waves of major environmental impacts. They lack healthy resilience and diversity. As in natural ecosystems, diversity confers resilience. A diverse human community hosts a variety of information and information sources, talents, experience, training and education, cultural wisdom, and types of material resources. All these riches form an important part of a community's ability to continue to function even after an impact (Wallace and Wallace, 2008). With each wave of housing destruction and mass migration, the communities of New York and other American cities became more segregated and homogeneous racially, ethnically, economically and with respect to educational attainment. By the early 1990s, respectable academicians openly labelled this phenomenon 'American apartheid' and statistically described the increase in racial segregation that occurred in 1970–1980 city by city (Massey and Denton, 1992).

Building Research & Information 2011 39:395–411.

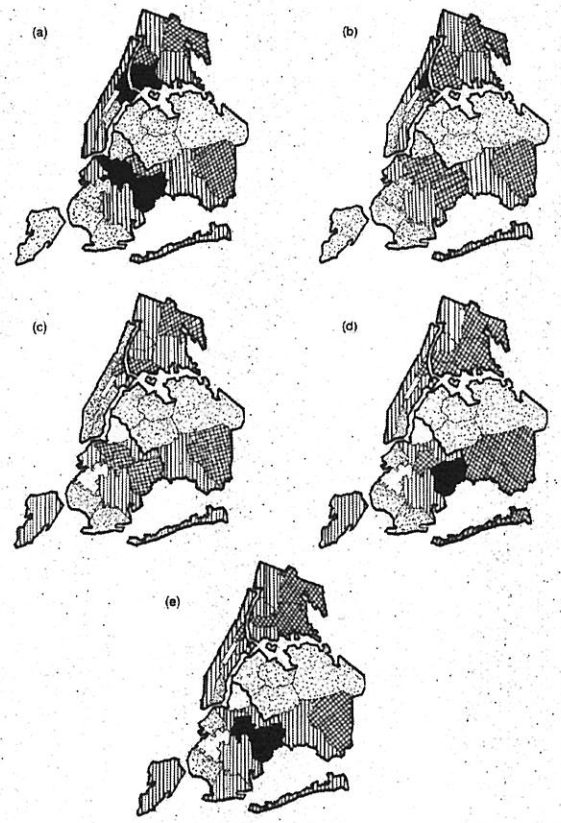

Figure 10 Incidences of low-weight births by health district: black = incidence of 12% or above; cross-hatching = incidence of 10.0–11.9%; stripes = incidence of 8.0–9.9%; stipple = incidence of 6.0–7.9%; and white = incidence below 6%. (A) Annual average incidence, 1989–1991; (B) annual average incidence, 1994–1996; (C) annual average incidence, 1999–2001; (D) annual average incidence, 2004–2006; and (E) annual incidence, 2008

The thrust of the past displacements and the ones taking place now looks like a Cape Town-ization of New York, with black and brown townships in the surrounding suburbs and a newly white and wealthy core in the central boroughs (Manhattan, the Bronx, Brooklyn). Indeed, for the first time in several decades, the majority of the population of Manhattan is white. Segregated white communities in New York are no more resilient than segregated black ones (Wallace *et al.*, 2007). The main difference is that the white communities are more shielded from impacts than are the black ones.

Building Research & Information 2011 39:395–411.

Sidebar: the accelerated life cycle of buildings in Harlem

Although the destruction of buildings by fire and abandonment has slowed considerably since the 1970s, it still occurs. These photographs illustrate the process as it is now happening in the Harlem neighbourhood of New York City. Eventually, the burned-out building will likely be razed and a new building constructed in its place which resembles the one under construction.

Photo 1 A building on the north-east corner of Morningside Avenue and 122 St. on fire, November 2003

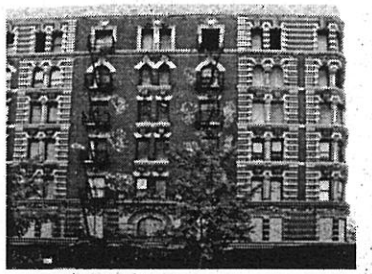

Photo 2 The current status of that building, September 2010: abandoned and unrepaired

Photo 3 The occupied companion building of the burned-out building with all its architectural details intact

Photo 4 A modern building under construction across the street from the burned-out building. This building is inharmonious with all its neighbours in size and style. The accommodation it offers is unaffordable to local people

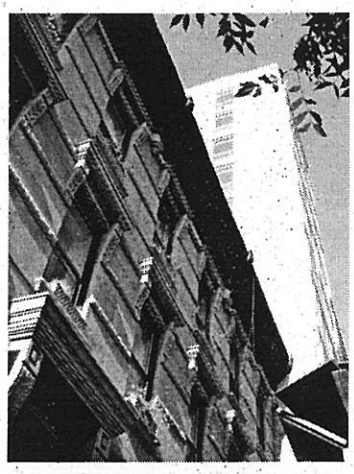

Photo 6 An example of the architectural details on the remaining brownstones

Photo 5 The incongruity of the new building with the ones next door in size and in style

Photo 7 On St. Nicholas Avenue, one block away from the burned-out and new buildings, a row of buildings in all stages of the life cycle. In the middle are occupied tenements. A vacant lot whose building was destroyed in the 1970s forms one end. On the other end is a building under construction. An abandoned building with its windows boarded up abuts the new one under construction

Building Research & Information 2011.39:395–411.

In the light of the present dynamics of the American and global economies, this shielding may diminish greatly as employment of even well-educated people becomes precarious. Wallace *et al.* (2007) imply that a lack of resilience in even white professional class communities is largely due to whiteness and economic uniformity leaves these communities highly vulnerable to the coming impacts. Diversity confers resilience and healthy continuity on communities.

All these social, economic and political dynamics depend on the buildings, their attributes, their maintenance, and their preservation/destruction and who is allowed to live in them. Every aspect of urban life depends on them from patterns of low-weight births to who gets the good jobs and who goes to college.

Conclusions

At every stage of its life, a building embodies the social, economic, and political processes and structures of many organizational levels from the community to the global. Although art historians and architects have filled libraries with analyses of how these processes and structures imprint themselves onto the design, siting, and construction of individual buildings and stands of buildings, the maintenance and destruction of buildings also reflects the same societal processes and structures. Indeed, the post-destruction period forms yet another stage in the historic trajectory of the levels of human organization, a stage which leads to another cycle of decisions and actions keyed to maintain power and wealth in their historic distributions.

This paper described the destruction and post-destruction periods of neighbourhoods in a large American city, a vivid example of the dynamics of many older American cities of the time. This case study may offer a warning for other urban areas. The municipality often finds steep costs associated with uprooting thousands of poor people in terms of disorganization and its public health and public safety consequences. Loss of resilience looms as a major price paid by both the affected communities and the municipality as a whole.

References

Dear, M. (1976) Abandoned housing, in J. Adams (ed.): *Urban Policy Making and Metropolitan Development*, Ballanger, Cambridge, pp. 59–99.

Drucker, E., Alcabes, P., Bosworth, W. and Sckell, B. (1994) Childhood tuberculosis in the Bronx, New York. *Lancet*, 343, 1482–1485.

Fullilove, M. (2005) *Root Shock: How Tearing Up City Neighborhoods Hurts America and What We Can Do About It*, Ballantine, New York, NY.

Granovetter, M. (1973) The strength of weak ties. *American Journal of Sociology*, 78, 1360–1380.

Hillier, A. (2003) Redlining and the Home Owners' Loan Corporation. *Journal of Urban History*, 29, 394–420.

Hunt, L. and Chambers, C. (1976) *The Heroin Epidemics*, , Spectrum, New York, NY.

Massey, D. and Denton, N. (1992) *American Apartheid*, Harvard University Press, Cambridge, MA.

McCord, C. and Freeman, H. (1990) Excess mortality in Harlem. *New England Journal of Medicine*, 322, 173–177.

New York Times (1970) Text of the Moynihan Memorandum on the status of Negroes. *New York Times*, p. 3, 3 January.

O'Campo, P., Xue, X., Wang, M. and Caughy, M. (1997) Neighborhood risk factors for low birthweight in Baltimore a multilevel analysis. *American Journal of Public Health*, 87, 1113–1118.

Odland, J. and Balzer, B. (1979) Localized externalities, contagious processes, and the deterioration of urban housing: an empirical analysis. *Socio-Economic Planning Science*, 13, 87–93.

Rosmond, R. and Bjorntorp, P. (1999) Psychosocial and socioeconomic factors in women and their relationship to obesity and regional body fat distribution. *International Journal of Obesity and Related Metabolism Disorders*, 23, 138–145.

Rothenberg, R. and Potterate, J. (1988) Temporal and social aspects of gonorrhoea transmission: the force of infectivity. *Sexually Transmitted Diseases*, 15, 88–92.

Sampson, R., Raudenbush, S. and Earls, F. (1997) Neighborhood and violent crime: a multilevel study of collective efficacy. *Science*, 277, 918–924.

Schempf, A., Stobino, D. and O'Campo, P. (2009) Neighborhood effects on birthweight: an exploration of psychosocial and behavioral pathways in Baltimore, 1995–1996. *Social Science and Medicine*, 68, 100–110.

Schwartz, J. (1993) *The New York Approach*, Ohio State University Press, Columbus, OH.

Stegman, M. (1981) *New York City Housing and Vacancy Survey, 1981*, NYC Department of Planning, New York, NY.

Struening, E., Wallace, R. and Moore, R. (1990) Housing conditions and the quality of children at birth. *Bulletin of the New York Academy of Medicine*, 66, 463–478.

United Nations (1998) *Annex 1 of the Report of the Special Rapporteur on Adequate Housing as a Component of the Right to an Adequate Standard of Living. Basic Principles and Guidelines on Development-based Evictions and Displacements*, , United Nations, New York, NY, A/HRC/4/18.

Vrekoussis, T., Kalantaridous, S., Mastorakos, G., Zoumakis, E., Makrigiannakis, A., Syrrou, M., Lavasidis, L., Relakis, K. and Chrousos, G. (ed.) (2010) The role of stress in female reproduction and pregnancy: an update, *Annals of the New York Academy of Sciences*, , Vol. 1205, pp. 69–75.

Wallace, D. (1994) The resurgence of tuberculosis in New York City: a mixed hierarchically and spatially diffused epidemic. *American Journal of Public Health*, 84, 1000–1002.

Wallace, D., Galea, S., Ahern, J. and Wallace, R. (2010) Death at an early age: AIDS and related mortality in New York City, in R. Wallace and D. Wallace (eds): *Gene Expression and its Discontents*, Springer, New York, NY, pp. 161–180.

Wallace, D. and Wallace, R. (1984) Structural fire as an urban parasite: population density dependence of structural fire in New York City and its implications. *Environment and Planning A*, 16, 249–260.

Wallace, D. and Wallace, R. (1998a) *A Plague on Your Houses: How New York City Was Burned Down and National Public Health Crumbled*, , Verso, New York, NY.

Wallace, D. and Wallace, R. (1998b) Scales of geography, time, and population: the study of violence as a public health problem. *American Journal of Public Health*, 88, 1853–1858.

Wallace, D. and Wallace, R. (1998c) Geography of asthma and diabetes over eight US metropolitan regions. *International*

Building Research & Information 2011.39:395–411.

Journal of Environmental Disease and Health Care Planning, 3, 73–88.

Wallace, D. and Wallace, R. (2000) Life and death in Upper Manhattan and the Bronx: an evolutionary perspective on catastrophic social change. *Environment and Planning A*, 32, 1245–1266.

Wallace, D. and Wallace, R. (2008) Urban systems during disasters: factors for resilience. *Ecology and Society*, 13, available at: http://www.ecologyandsociety.org/vol13/iss1.

Wallace, D., Wallace, R. and Rauh, V. (2003) Community stress, demoralization, and body mass index: evidence for social signal transduction. *Society, Science and Medicine*, 56, 2467–2478.

Wallace, R., Fullilove, M. and Flisher, A. (1996) AIDS, violence and behavioral coding: information theory, risk behavior, and dynamic process on core-group sociogeographic networks. *Society, Science and Medicine*, 43, 339–352.

Wallace, R. and Wallace, D. (1983) Urban fire as an unstabilized parasite: the 1976–1978 outbreak in Bushwick, Brooklyn. *Environment and Planning A*, 15, 207–226.

Wallace, R. and Wallace, D. (1990) Origins of public health collapse in New York City: the dynamics of planned shrinkage, contagious urban decay, and social disintegration. *Bulletin of the New York Academy of Medicine*, 66, 391–434.

Wallace, R., Wallace, D., Ahern, J. and Galea, S. (2007) A failure of resilience: estimating response of New York City's public health ecosystem to sudden disaster. *Health and Place*, 13, 545–550.

Youmans, G. (1979) *Tuberculosis*, W. B. Saunders, Philadelphia, PA.

Building Research & Information 2011.39:395-411.

Testimony Before the New York City Council
Committee on Technology
Automated Processing of Data for the Purposes of Targeting Services, Penalties, or Policing to Persons - Int. No. 1696
October 16, 2017

Introduction

Good afternoon Chair Vacca and members of the Technology Committee. My name is Taline Sanassarian, and I am the Policy Director at Tech:NYC, a nonprofit trade group with the mission of supporting the technology industry in New York through increased engagement between our more than 500 members, New York City government, and the community at large.

Tech:NYC believes that New York's unique business ecosystem as a global center for so many industries such as finance, media, fashion, art, and real estate, serves to strengthen the technology businesses that call New York home; and in turn, technology further strengthens those incumbent industries and our communities.

Access to Data

With that in mind, we are here today to express our concerns regarding bill 1696 before you, which seeks to amend the administrative code in relation to the automated processing of data for the purpose of targeting services, penalties, or policing to persons.

At the outset, we want to be clear that we strongly believe in transparency and ensuring that algorithms—including those that govern the provision of public services—treat residents fairly and without any inherent biases. This particular proposal, however, is unworkable from the perspective of many of our members who are engaged in the local tech community.

Specifically, imposing disclosure requirements that will require the publishing of confidential and proprietary information on city websites could unintentionally provide an opportunity for bad actors to copy programs and systems. This would not only devalue the code itself, but could also open the door for those looking to compromise the security and safety of systems, potentially exposing underlying sensitive citizen data. Indeed, one need look no further than the recent breaches of

data, including at Equifax, which affected as many as 145 million Americans, and at the Office of Personnel Management (OPM), in which sensitive personal information was stolen from current, and former government employees and contractors. These are examples of the kind of dangers that both public and private actors currently face, and given the sensitivity of the underlying data, it is crucial that any relevant law or regulation treats security concerns seriously. We are worried that this bill, in its current form, does not do that.

Further, as you know, algorithms are used to improve service and reliability in numerous city services, such as hospitals, emergency services, schools, and courts. As such, the lack of a clear understanding of the impact to these systems is concerning.

Also, mandating proprietary information, which many companies have built their businesses on, be shared on public websites could cause a chilling effect on local companies willing to do business with the City.

Unfortunately, this proposal does not take these concerns into account, and therefore, we urge caution before imposing such broad and sweeping mandates. Instead, we ask the Committee to work with the private and public sectors to find a more workable solution that could increase transparency while allowing companies and contractors to protect confidential business information.

Conclusion

Tech:NYC believes there could be better ways to address concerns underlying the proposed bill and urges this Committee to more closely examine potential ramifications of this legislation. We are happy to provide any assistance or input that the Committee requests towards that effort.

Thank you for your time today, and we look forward to continuing this conversation.

To: NYC Council - Committee on Technology
From: Noel Hidalgo, Executive Director of BetaNYC
Re: **Intro 1696-2017 (Open Algorithms Bill)**

Monday, 16 October 2017

"We [...] want to ensure that New York City leads the way in ethical algorithmic government. We want transparency around data tools, algorithms, artificial intelligence, and tracking. We want New York City to be the thought leader in smart, ethical, algorithmic government." - 4 Jan 2016 - http://bit.ly/BetaNYC-2016-YearInReview

Summary:

- This is a forward thinking bill that provides justice in the 21st century.
- Copyright nor "trade secrets" should ever stand in the way of an equitable, accountable municipal government.
- This bill needs accountability within the Administration and Agencies; there should an annual report.
- Each algorithm should have a dictionary, similar to existing the city's open data law.
- Collectively, algorithms should be accessible via a single catalog and best practices should be documented within a technical standards manual, similar to the City's existing open data law.

Testimony:

Thank you for this opportunity to vocalize our support for Intro 1696-2017.

Today, I speak as the Executive Director of BetaNYC, a former Technology and Democracy fellow of Harvard Kennedy School's Ash Center, and a former fellow at Data & Society Research Intuition.

For the past five years, BetaNYC has worked with two Mayoral Administrations and the City Council to ensure the City has the best municipal open data law. While we continue to improve its language, we are honored to see this introductory bill tackle an important part of our 21st century.

BetaNYC is a community of over 4,400 technologists, designers, data scientists, and civic hackers who want to see an equitable municipal government in the 21st century. This legislation reinforces the core of a future equitable municipal government.

In 2016, Data and Society Research Institution produced a number documents outlining what is as stake. We must be concerned about technology companies as dominant curators of information and their unprecedented power to engineering the public sphere and social services.[1]

To be blunt, the future of our democratic practice is at stake. If we refuse to hold algorithms and their authors' accountable, we will no longer have government for the people, by the people. If we refuse to hold algorithms and their authors' accountable, we outsource our government to the unknown.

At NYC School of Data, our annual conference, we hosted a panel on *algorithmic discrim-innovation* and we discussed how parts of our criminal justice system governed by a black box.[2]

How can we talk about justice when we can not see software code, algorithm, no hold the underlying software accountable in the same way we hold humans accountable?

Democracy requires transparency; copyright nor "trade secrets" should ever stand in the way of an equitable, accountable municipal government.

We are very fortunate that the city's existing open data law provides a framework for this bill. In our written testimony, we've outline a few core components we would like to see added.

BetaNYC looks forward to a healthy and honest debate around the passage of the nation's first open algorithms law.

Thank you,

Noel A. Hidalgo
BetaNYC, Executive Director
Harvard Kennedy School's Ash Center, Technology and Democracy Fellow, 2016 - 2017
Data & Society Research Institution, Fellow 2015 - 2016; Affiliate, 2016 - Current

[1] http://bit.ly/DNS-AlgorithmsPublics
[2] https://youtu.be/9U1Ka5DJXTU

Accountability

Someone within the Administration and someone within each agency should be designated as a point of contact for the publication and reporting of algorithms. Annually, there should be a report that outlines agency reporting and use of algorithms.

A Central Aggregation of Algorithms

In the same way the City pioneered open data directories and catalogs, the City should produce a central listing of published algorithms. This directory doesn't need to be as advanced as the city's data portal, but it would be nice to have a comprehensive listing of algorithms title, purpose, code, function and attribute documentation, public liaison & their contact information, date of introduction, and method to test the code.

Algorithm Dictionaries

Like all technical objects, each algorithm should have a small dictionary that explains the function, its purpose, and data sources.

Technical Standards Manual

Similar to the City's open data law, there should be a technical manual that highlights the City's algorithmic use, practice, and best practices.

Private Right of Action / Enforcement

We, the people, will need the ability to ensure that Administrations and Agencies comply with this law. Please ensure that the the public can hold Administrations and Agencies in compliance with the law.

TESTIMONY OF PROFESSOR HELEN NISSENBAUM, DR JULIA POWLES, AND ASSOCIATE PROFESSOR THOMAS RISTENPART (CORNELL TECH) BEFORE THE NEW YORK CITY COUNCIL COMMITTEE ON TECHNOLOGY

Hearing on Int. No. 1696, a Local Law to amend the administrative code of the city of New York, in relation to automated processing of data for the purposes of targeting services, penalties, or policing to persons

Monday, October 16, 2017

Good afternoon, Chair Vacca and members of the Committee on Technology. My name is Julia Powles, and I am a Research Fellow in the Digital Life Initiative at Cornell Tech, New York City's bold new interdisciplinary research and technology campus at Roosevelt Island. I am joined in providing this testimony by two of my Cornell Tech colleagues, **Helen Nissenbaum,** Professor of Information Science and Director of the Digital Life Initiative, and **Thomas Ristenpart**, Associate Professor of Computer Science. Our work over many years speaks to various angles of this afternoon's hearing, but perhaps most pertinently, this June, Professors Nissenbaum and Ristenpart launched a major, multi-year, NSF-funded research project led by Cornell Tech, Carnegie Mellon University, and the International Computer Science Institute, Berkeley, to investigate threats to privacy and fairness in automated decision-making systems and, in particular, to develop mechanisms for accountable information use in such systems.[1]

The most important work that a Bill in the area of automated systems can do is to build **accountability**—both the accountability of vendors of these systems to the City, and the accountability of the City and its agencies to the people of New York. This Bill is an ambitious attempt to seek accountability through transparency. It attempts this by two means: first, a requirement of source code disclosure; and second, by mediating what is known in the field as "black-box testing"—a mechanism for testing inputs, generating outputs, and deriving insights. Before elaborating further, we would like to add to the chorus of those who have expressed appreciation to Council Member Vacca for bringing forward this proposal, as well as to the Committee on Technology for its important efforts to bring greater transparency—and, potentially, accountability—to automated systems that profoundly affect people's lives and life chances. This legislative direction is both exciting and essential. It offers the City Administration the opportunity to be a real bellwether, not only of good governance and government, but of innovation of the truest kind, stimulating better technologies and better civic engagement.

In this testimony, we suggest ways to make the Bill more effective in realizing its ambitions, and offer concrete recommendations to improve it.

A Bill like this has the potential to address several stark gaps in our regulatory landscape. When data is fed into a computer system and used to allocate public services, penalties, or policing, people deserve to know that the system is functioning in accordance with the City's aims and values. That it is not arbitrary, unfair, or incorrect. That it does not amplify inequality. This means being able to find out what data is used, how it is processed, and what else is taken into

---

[1] National Science Foundation, SaTC: CORE: Large: Collaborative: Accountable Information Use: Privacy and Fairness in Decision-Making Systems, CNS-1704527.

consideration in decision-making, both in general and in individual cases. There should be opportunities to test and contest the input, processing, and output. In other words, there is a need for *accountable* systems, including clear processes for calling to account responsible parties (those designing, procuring, or using systems), if there is cause for complaint, or even suspicion that systems under consideration or in use are failing to meet aims and values.

This Bill makes important advances, but in order to meet these critical ends, there are dimensions it does not yet address in its current formulation. For example, it gives no view onto the data that is being used by an automated system, nor how decisions are made in general or individual cases. Some capacity to test and understand systems is offered, but if what is seen in the source code (if it is even provided) or through black-box testing is unsatisfactory, there is no direct mechanism for contestation and bringing responsible parties to account. In other words, ambitious and important though this Bill is, it relies on a degree of accountability emerging as a by-product of a very particular, and potentially limited, kind of public transparency. It is well within the capacity of New York City to tackle the targets of both transparency and accountability much more directly.

A primary source of these limitations comes from the location of the Bill and the provisions that surround it. The section of the Administrative Code where the provisions are proposed to be inserted concerns "Open Data." This fundamentally affects the nature and impact of the Bill as it is currently drafted. It means, crucially, that, according to section 23-504(c) of the Code, the Bill gives rise to no actionable rights, either for individuals or against an agency. Section 23-504(a) makes clear that data is provided to the public only "for informational purposes," with section 23-504(b) clarifying that there are no guarantees as to "completeness, accuracy, content, or fitness for use." Further, the Bill's placement within the Open Data provisions also means that, following the logic of sections 23-501(g), any proprietary claims and intellectual property assertions in relation to the code and systems, no matter how broad or baseless, will readily thwart the intent to provide transparency.

It may be that locating these provisions in the Open Data provisions is regarded as optimal for other reasons, such as uniform Council support for the City's commitment to open public processes, but the legislative context should be given further and careful consideration. If it is resolved that the present location remains the most desirable among a range of legislative options, the Bill should be elaborated, and the applicability or otherwise of the remainder of the Open data provisions should be explicitly addressed, particularly those concerning private rights of action, liability of agencies, and the tension between disclosure of the source code and operations of automated systems and proprietary interests.

Turning to the aspect of the Bill that concerns black-box testing, the requirement as proposed is likely to be administratively burdensome on agencies, to the point of potential impracticality, given the dynamism of automated systems, and the fact that effective black-box testing in the public interest can require thousands of queries (or more), depending on the context; a prospect that is likely to be highly constrained if every query must be mediated through an agency request.

Collectively, these realities mean that the proposed Bill as it stands has limited purchase on the target of accountability, and that there are significant obstacles to it being the strong instrument of algorithmic transparency that it could be, though it makes important strides in this direction.

None of these weaknesses are fatal, and the necessary leverage is well within the remit and capacity of the New York City Administration to address. Council Members committed to the important cause of improving the transparency and accountability of automated systems have a number of options available to them to help realize the objectives behind this Bill. We have eight recommendations.

First, given the limitations of the Open Data provisions, consider other parts of the Code where these provisions might be better located.

Second, ensure that automated systems used for the provision of public services, penalties, and policing disclose all data sources that they incorporate, as well as additional parameters about the data selected for training, model choices, excluded data, and other standardized requirements for best practice disclosure for interpretability and accountability.

Third, ensure that intellectual property and other proprietary rights' assertions cannot be used to defeat algorithmic transparency requirements. Explore qualified transparency if public transparency is not possible.

Fourth, develop mechanisms to tie transparency requirements more strongly to enforcement, such as through making City funding of agencies conditional upon meeting certain explicit standards of algorithmic disclosure and interpretability, audited by independent expert assessors.

Fifth, establish private rights of action for systems that are found to be unsatisfactory.

Sixth, in consultation with experts, establish benchmarks for best practices for source code disclosure. Establish how frequently code updates should be notified, as well as any limitations on disclosure, publication, and retention.

Seventh, in consultation with experts, establish how black-box testing requirements are going to be managed at a practical level. Provide examples for how outputs of user-submitted tests will be provided to users. Ensure that third party testing in the public interest, sometimes requiring thousands of queries, can be managed without becoming burdensome on agencies.

Eighth, institute a City-wide practice that when agencies engage vendors of automated systems, any data sources continue to be managed in the public interest. This entails non-exclusive data use, transparency about integration with other data sources, and ongoing public stewardship over the data—whether in raw, cleaned, catalogued, or systematized form.

These are our recommendations. Thank you for your time, and we applaud you again for this bold and inspiring legislative effort. Cornell Tech and the Digital Life Initiative are dedicated to the development and deployment of technologies in the public interest, and we are committed to being a partner to the City in this essential endeavor.

NYCLU
NEW YORK CIVIL LIBERTIES UNION

125 Broad Street, 19th floor
New York, NY 10004
212.607.3300
212.607.3318
www.nyclu.org

Testimony of the New York Civil Liberties Union before the New York City Council Committee on Technology regarding Automated Processing of Data (Int. 1696-2017)

October 16, 2017

The New York Civil Liberties Union ("NYCLU") respectfully submits the following testimony in support of Int. 1696, legislation relating to government use of computer algorithms. The NYCLU, the New York state affiliate of the American Civil Liberties Union, is a not-for-profit, non-partisan organization with eight offices across the state, and over 160,000 members and supporters statewide. The NYCLU's mission is to defend and promote the fundamental principles, rights and constitutional values embodied in the Bill of Rights of the U.S. Constitution and the Constitution of the State of New York.

Algorithms are a series of steps or instructions that are designed to perform a specific task or solve a problem. Algorithms are widely used in society to make decisions that affect most aspects of our lives, including which school a child can attend, whether a person will be offered credit from a bank, what products are advertised to consumers, and whether someone will receive an interview for a job. Federal, state and local governments are increasingly using algorithms to conduct government services. One of the promises of algorithms is that they can process, analyze and manipulate large amounts of data to help optimize government services.

However, algorithms are fallible human creations that are vulnerable to many sources of bias and error. So there should be great concern when governments employ algorithms whose design and implementation are not understood by the government agents using them or the public. There is a strong public interest in ensuring that algorithms are designed and used in an equitable manner, especially when they affect decisions regarding the use of government force, allocation of public resources, or the potential deprivation of civil liberties. In order to make this assessment, information about the design, use, and functions of algorithms must be transparent. Without algorithmic transparency, governments stand to lose democratic accountability, efficacy and fairness of government processes, and control over sensitive public data.

Int. 1696 requires any government agency that uses algorithms for targeting government services, policing, or imposing penalties, to publish the source code of the algorithm on the agency's website. The legislation also requires these government agencies to allow the public to submit data to test the algorithm and receive the results of these tests. This legislation is a necessary step in ensuring that government use of algorithms actually benefits New Yorkers. We urge the City Council to take action and pass Int. 1696 into law.

I. GOVERNMENT USE OF ALGORITHMS

As the power and responsibilities of government administrative agencies have grown, often without concomitant funding increases, administrators have increasingly employed algorithms and other automated systems to reduce backlogs, identify problems, and eliminate guesswork by government agents. Algorithms are used by the New York City Department of Education to evaluate teachers;[1] by the New York City Fire Department to anticipate where fires may spark;[2] and by the New York City Department of Health to identify serious pregnancy complications.[3] These are just a few of the many functions throughout City government that algorithms serve.

But government use of algorithms creates significant threats to personal liberty. Despite the growing concerns regarding the fairness and efficacy of algorithms, as well as the due process problems they create, there seems to be no slowing in their adoption to conduct public affairs. This is in part because of the growing "smart cities" movement that seeks to integrate data collection and technological solutions to address local government needs. Yet, as governments shift to more data-driven, algorithm based decision-making, careful scrutiny of algorithms and public engagement to assess them becomes increasingly important.

II. ALGORITHMS CONTAIN MANY SOURCES OF BIAS AND ERROR

Although algorithms may appear to be inherently neutral, each step in creating an algorithm requires the programmer to make decisions, some consequential and some trivial. As a result, algorithms are vulnerable to human bias, poor judgment, unavoidable trade-offs and careless or unforeseen errors at each stage of development and use. Moreover, the data on which algorithms are trained often reflects existing discrimination and disparities; as a consequence, algorithms will often themselves be biased unless developers take proactive de-biasing steps.

---

[1] Framework for Teaching Evaluation Instruments, http://usny.nysed.gov/rttt/teachers-leaders/practicerubrics/Docs/danielson-teacher-rubric.pdf.

[2] Brian Heaton, *New York City Fights Fire with Data*, GOVERNMENT TECHNOLOGY, MAY 15, 2015, http://www.govtech.com/public-safety/New-York-City-Fights-Fire-with-Data.html.

[3] NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE, BUREAU OF MATERNAL, INFANT AND REPRODUCTIVE HEALTH, NEW YORK CITY, 2008-2012: SEVERE MATERNAL (2016), https://www1.nyc.gov/assets/doh/downloads/pdf/data/maternal-morbidity-report-08-12.pdf.

Design of the Algorithm

At the design stage, programmers must make a series of decisions about how the algorithm will function as well as its limitations. These decisions include the arrangement of user functions, the technical architecture of the system, data selection, and factor weighting. Though these decisions seem technical in nature, they can result in promoting certain values or advantaging certain groups of people or outcomes.

Some design decisions that tend to favor certain values, interests, groups, or outcomes are intentional. A positive example is a design decision that promotes consumer privacy, such as systems that do not store or immediately delete user data records.[4] However, intentional decisions regarding algorithm design may be perverted by ulterior goals or motives. In Italy, a government programmer conspired with over 100 police officers and local government officials to code red light cameras so that the system would turn from yellow to red quicker, so more motorists could be caught.[5]

Similarly, financial incentives may drive programmers to design an algorithm that will produce results that favor the customer's preferred outcome, rather than accurate or fair outputs. This is particularly true for algorithm based forensic tools that are sold exclusively to government agencies.[6] In the past three years, public crime labs in Austin, Texas and Washington, D.C. have temporarily shut down DNA testing because of flawed algorithmic systems.[7] More recently, ProPublica reporting revealed that thousands of criminal cases may be compromised by the New York City's crime lab use of an algorithm that may have been intentionally skewed to create more matches.[8]

---

[4] Harry Surden, *Values Embedded in Legal Artificial Intelligence* at 2 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2932333.

[5] Jacqui Cheng, *Italian Red-Light Cameras Rigged with Shorter Yellow Lights*, ARS TECHNICA, Feb. 2, 2009, http://arstechnica.com/tech-policy/news/2009/02/italian-red-light-camerasrigged-with-shorter-yellow-lights.

[6] Rebecca Wexler, Convicted by Code, SLATE, Oct. 6,2017, http://www.slate.com/blogs/future_tense/2015/10/06/defendants_should_be_able_to_inspect_software_code_used_in_forensics.html; Anne Q. Hoy, *Fingerprint Source Identity Lacks Scientific Basis for Legal Certainty*, Am. ASSOC. FOR THE ADVANCEMENT OF SCI., Sept.15, 2017, https://www.aaas.org/news/fingerprint-source-identity-lacks-scientific-basis-legal-certainty.

[7] Keith L. Alexander, *National accreditation board suspends all DNA testing at D.C. crime lab,* WASHINGTON POST, Apr. 27, 2015, https://www.washingtonpost.com/local/crime/national-accreditation-board-suspends-all-dna-testing-at-district-lab/2015/04/26/2da43d9a-ec24-11e4-a55f-38924fca94f9_story.html?utm_term=.24780d3105ea; Tony Plohetski, *Austin police DNA lab closed amid forensics commission's concerns*, AMERICAN-STATEMAN, June 10,2016, http://www.mystatesman.com/news/austin-police-dna-lab-closed-amid-forensics-commission-concerns/rjbYwEnkci0lVy7LAPXVnM/.

[8] Lauren Kirchner, *Thousands of Criminal Cases in New York Relied on Disputed DNA Testing Techniques*, PROPUBLICA, Sept. 4, 2017, https://www.propublica.org/article/thousands-of-criminal-cases-in-new-york-relied-on-disputed-dna-testing-techniques.

Other design decisions are made for technical, efficiency, usability, functionality, business or practical reasons; but they often involve significant trade-offs.[9] Programmers may make decisions that increase the utility or performance of algorithms, but conflict with societal notions of fairness. One example is incorporating parents' mental health history as a factor in assessing child endangerment risks. The use of an algorithm that assigns significant weight to use of the mental health system can have the effect of penalizing individuals who seek mental health treatment, which raises fairness, welfare and legal concerns.[10]

Programmers also make mistakes at the design stage. One study found that even highly experienced programmers failed to identify or correct technical mistakes when coding, which resulted "in almost 1% of all expressions contained in source code being wrong."[11] Mistakes are also more likely to occur when real-world policies written in human language are converted to computer languages. These mistakes can be a result of misinterpretations of the policy on the part of the programmer or because code may not capture certain nuances in the original policy. When these mistakes go unnoticed in government algorithms, they carry expensive or irreversible consequences. In Colorado, programmers encoded over 900 mistakes in an algorithm used to administer the state's public benefit system; this resulted in cancer patients and pregnant women being falsely denied Medicaid benefits, and eligible food stamp recipients having their benefits discontinued.[12] These mistakes affected hundreds of thousands of people, wasted several hundred million dollars, and resulted in litigation as well as a federal probe.[13]

Training the Algorithm

Part of the development of a modern algorithm involves training it on a set of data. Programmers make numerous decisions regarding how an algorithm will be trained, including what data inputs are used and how much data the system has capacity to process. Thus, the decisions regarding what data is used and the quality of that data can result in undesirable, misleading, or biased outputs.

A common programming error is the use of poorly-selected data inputs. Problems include choosing a data set that is too small or too homogenous, or flaws in the technical rigor and

---

[9] Harry Surden, *Values Embedded in Legal Artificial Intelligence* at 1 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2932333.

[10] Robert Brauneis and Ellen P. Goodman, *Algorithmic Transparency for The Smart City* at 16 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3012499.

[11] Christian Chessman, *A "Source" of Error: Computer Code, Criminal Defendants, and the Constitution*, 105 Cal. L. Rev. 179, 186 (2017), http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=4350&context=californialawreview citing Derek M. Jones, *Operand Names Influence Operator Precedence Decisions*, 20 CVU 1, 2, 5 (2008).

[12] Danielle Keats Citron, *Technological Due Process*, 85 WASH. U. L. REV. 1248, 1268-9 (2008).

[13] *Id.*; The Denver Post, Editorial, *Why is the CBMS still such a mess?*, DENVER POST, Feb. 17, 2011, http://www.denverpost.com/2011/02/17/editorial-why-is-cbms-still-such-a-mess/.

comprehensiveness of data collection resulting in incomplete or incorrect data.[14] For example, several algorithm-based facial-recognition systems that were trained on photos of predominately white people resulted in racist outputs, such as classifying images of black people as gorillas.[15]

A more troubling error is the use of real-world data sets that reflect historical or societal discrimination. As a result of residential segregation, geographic designations may serve as proxies for race, leading to false data correlations that perpetuate bias. Notably, predictive policing systems have been criticized for overreliance on inherently biased historical police data.[16] In fact, the Oakland Police Department decided against using a predictive policing algorithm after a study showed that the system would have disproportionately deployed police to lower-income, minority neighborhoods for drug crimes, even though public health data suggested drug crimes occurred in many other neighborhoods throughout Oakland.[17]

Interpreting and Using the Algorithm's Results

When end users are not properly trained on the purpose of an algorithm, or not informed about the underlying logic of its design, it can be very difficult for them to fully comprehend the results. This lack of understanding and training can lead to government agents misinterpreting or giving too much deference to algorithmic results. If the algorithm is inscrutable, government agents will either have to disregard it completely or blindly follow the result. This outcome conflicts with traditional notions of government accountability, particularly if the results influence decisions that affect civil liberties.

If government officials falsely believe that the algorithmic results are inherently neutral or otherwise superior to human judgment, they may simply reify the algorithm's choice. Too much deference can be extremely problematic, since algorithms, by nature, simplify or generalize data making categorical judgments that treat people as members of groups, rather than as

---

[14] Executive Office of the President, *Big Data: A Report on Algorithmic Systems, Opportunity, and Civil Rights* at 7-8, May 4, 2016, https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/2016_0504_data_discrimination.pdf.

[15] Kate Crawford, *Artificial Intelligence's White Guy Problem*, N.Y. TIMES, Jun. 25, 2016, https://www.nytimes.com/2016/06/26/opinion/sunday/artificial-intelligences-white-guy-problem.html; Alistair Barr, *Google Mistakenly Tags Black People as 'Gorillas,' Showing Limits of Algorithms*, WALL ST. J., Jul. 1, 2015, https://blogs.wsj.com/digits/2015/07/01/google-mistakenly-tags-black-people-as-gorillas-showing-limits-of-algorithms/; Odelia Lee, *Camera Misses the Mark on Racial Sensitivity*, GIZMODO, May 15, 2009, https://gizmodo.com/5256650/camera-misses-the-mark-on-racial-sensitivity.

[16] CATHY O'NEIL, WEAPONS OF MATH DESTRUCTION at xx (2016).

[17] Emily Thomas, *Why Oakland Police Turned Down Predictive Policing*, MOTHERBOARD, De. 28, 2016, https://motherboard.vice.com/en_us/article/ezp8zp/minority-retort-why-oakland-police-turned-down-predictive-policing; Kristian Lum, *Predictive Policing Reinforces Police Bias*, HUMAN RIGHTS DATA ANALYSIS GROUP, Oct. 10, 2016 ,https://hrdag.org/2016/10/10/predictive-policing-reinforces-police-bias/.

individuals.[18] In fact, research suggests that, over time, deference to algorithms may weaken the decision-making capacity of government officials, who may become incapable of responsibly deviating from algorithmic instructions.[19]

III. IMPORTANCE OF ALGORITHMIC TRANSPARENCY

Most local governments lack the expertise and resources required to develop algorithmic systems for all agency functions. As a result, privately developed algorithms are shaping local government procedures and decisions; yet it is often the case that neither members of the public nor government agents know much about the design or implementation of algorithm-based systems. There has always been and, to some degree, there will always be some risk of error or bias in government decision making; however, the opacity regarding government algorithms serve to increase the risk.

Algorithmic systems function best when stakeholders have access to enough information so that they can identify problems in the design of the algorithm, and it its application. Therefore, greater transparency about the algorithms that government agencies use and how they are being used or implemented can help increase the accuracy, fairness, and overall utility of these tools. As algorithmic tools improve, they produce greater cost savings and help local governments become more sustainable. Algorithmic transparency can also help increase public confidence in government practices and systems by making the constituents feel like they actively engage the government systems that affect their lives. Conversely, if algorithm-based decisions of government remain opaque and invisible, New Yorkers will feel increasingly confused about the rationale for government policies; this will lead to increasing skepticism about the fairness and accountability of government officials and the decisions they make.

Currently, federal and state open records laws are the primary vehicles to making government use of algorithms more transparent. These methods are imperfect because government responses to requests for sources codes and other relevant data are typically slow, incomplete, or nonresponsive. Therefore, we urge the City Council to pass Int. 1696 as soon as possible because the civil liberties and civil rights of New Yorkers depend on it.

---

[18] Robert Brauneis and Ellen P. Goodman, *Algorithmic Transparency for The Smart City* at 15 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3012499.

[19] Robert Brauneis and Ellen P. Goodman, *Algorithmic Transparency for The Smart City* at 19 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3012499.

BRENNAN
CENTER
FOR JUSTICE
TWENTY
YEARS

Brennan Center for Justice
at New York University School of Law

120 Broadway
Suite 1750
New York, New York 10271
646.292.8310 Fax 212.463.7308
www.brennancenter.org

TESTIMONY OF THE BRENNAN CENTER FOR JUSTICE

Rachel Levinson-Waldman
Senior Counsel, Liberty & National Security Program

before

THE NEW YORK CITY COUNCIL COMMITTEE ON TECHNOLOGY

regarding

Int. 1696, RELATING TO THE DISCLOSURE OF SOURCE CODE BY AGENCIES ENGAGED IN POLICING AND OTHER SERVICES

October 16, 2017

Dear Chairman Vacca and Members of the New York City Council's Committee on Technology:

Thank you very much for giving me this opportunity to speak to the Committee today. My name is Rachel Levinson-Waldman, and I am Senior Counsel to the Liberty and National Security Program at the Brennan Center for Justice. I am pleased to be testifying today about the Committee's bill to require that agencies using algorithms to engage in policing, among other services, disclose the source code for those algorithms and allow users to submit data for processing.

The Brennan Center is a nonpartisan law and policy institute that seeks to improve our systems of democracy and justice. The Liberty and National Security Program focuses on restoring the proper flow of information between the government and the people by securing increased public access to government information; ensuring government policies targeting terrorists do so effectively and without religious or ethnic profiling; and securing appropriate government oversight and accountability.

As part of that work, I filed a Freedom of Information Law (FOIL) request last year with the New York City Police Department, requesting information about the New York City Police Department's use of predictive policing technologies.

By way of background, predictive policing involves the use of statistics or algorithms to make inferences about crime – the risk that crime is going to occur in a particular geographic area or jurisdiction, or the risk that a particular person is going to commit a crime. Predictive policing has been the subject of considerable criticism from civil rights and civil liberties advocates.[1] There have been significant concerns that predictive policing both relies on and recreates patterns of biased law enforcement, simply sending officers back to neighborhoods that are already overpoliced.[2] In addition, there is little proof that predictive policing is actually effective in predicting and reducing crime.[3] One phrase often used is that predictive policing predicts policing – it does not predict crime.[4]

In light of these concerns, transparency regarding the code that provides the foundation for predictive policing is paramount.[5] According to publicly available documents that we reviewed in preparation for our FOIL request, the NYPD expected to spend about $45 million on predictive policing technologies over the course of five years.[6] However, there

---

[1] *See, e.g.,* Leadership Conference on Civil and Human Rights, et al., Predictive Policing Today: A Shared Statement of Civil Rights Concerns (Aug. 31, 2016), *available at* http://civilrightsdocs.info/pdf/FINAL_JointStatementPredictivePolicing.pdf.

[2] *See, e.g.,* Jack Smith IV, *Crime-prediction tool PredPol amplifies racially biased policing, study shows*, MIC (Oct. 9, 2016), https://mic.com/articles/156286/crime-predictiontool-pred-pol-only-amplifies-racially-biased-policing-study-shows (last visited Oct. 15, 2017); *see also* Laura Nahmias, *NYPD Testing Crime-Forecast Software*, POLITICO (July 8, 2015, 5:52 AM EDT), http://www.politico.com/states/new-york/city-hall/story/2015/07/nypd-testing-crime-forecast-software-090820 (quoting maker of predictive policing software as noting the importance of assessing "how we apply statistics and data in a way that's going to be sensitive to civil rights and surveillance and privacy concerns").

[3] *See, e.g.*, WILLIAM J. HAYES, NAVAL POSTGRADUATE SCH., CASE STUDIES OF PREDICTIVE ANALYSIS APPLICATIONS IN LAW ENFORCEMENT (Dec. 2015), *available at* https://www.hsdl.org/?view&did=790324; Martin Maximino, *The Effectiveness of Predictive Policing: Lessons From A Randomized Controlled Trial*, JOURNALIST RES. (last updated Nov. 6, 2014), https://journalistsresource.org/studies/government/criminal-justice/predictive-policing-randomized-controlled-trial; Matt Stroud, *Chicago's Predictive Policing Tool Just Failed A Major Test* (Aug. 19, 2016, 10:28 AM EDT), https://www.theverge.com/2016/8/19/12552384/chicago-heat-list-tool-failed-rand-test.

[4] *See* Ezekiel Edwards, *Predictive Policing Software Is More Accurate At Predicting Policing Than Predicting Crime*, HUFFPOST (Aug. 31, 2016, 2:58 EDT), https://www.huffingtonpost.com/entry/predictive-policing-reform_us_57c6ffe0e4b0e60d31dc9120.

[5] *See* David Black, *Here Comes Predictive Policing: The Next Wave of Crimefighting Technology Is Being Tested In New York City*, N.Y. DAILY NEWS (Jan. 24, 2016), http://www.nydailynews.com/opinion/david-black-predictive-policing-article-1.2506580 (last visited Oct. 15, 2017) ("Most important, the use of predictive policing technologies must be transparent — and carefully overseen by vigilant citizens themselves.").

[6] *See, e.g.*, CITY OF N.Y., DEVELOPING THE NYPD'S INFORMATION TECHNOLOGY 6-7, *available at* http://home.nyc.gov/html/nypd/html/home/POA/pdf/Technology.pdf (last visited Oct. 16, 2017); *Mayor de Blasio, Police Commissioner Bratton Announce CompStat 2.0*, CITY OF N.Y. (Feb. 23,

was little information publicly available about how the department intended to use the technologies, what information would be inputted, and how the community would be affected, among other questions. Without more information, we were concerned that the police department's use of predictive policing was occurring in the dark, with little information available to the most affected communities about how policing decisions were being made or opportunity for those communities to make their concerns known.

We therefore filed a FOIL request last July for a range of documents, including information about how the NYPD's predictive policing program was using the data put into it, and the specific algorithms in use. The NYPD rejected our request in a one-page letter, providing no records in response. We appealed, and the department denied our appeal, again disclosing no records or other information about their predictive policing program.

In December of 2016, we sued; in our lawsuit, we emphasized the important interests in transparency that FOIL embodies, much as this legislation does as well.[7] Almost immediately after we filed suit, the NYPD disclosed a number of documents – but they refused to disclose the source code for their predictive policing algorithm, and have continued to refuse to disclose a range of other important information.[8] As a result, there is still far too little known about the practical mechanics of this policing practice.

It is worth noting that the NYPD has expressed concerns about making the source code for it predictive policing program publicly known; the department has argued that with the source code in hand, criminals could learn where police officers will be patrolling and evade detection. We believe – as we have told the NYPD and the judge hearing our case – that this risk is remote. Predictive policing programs generally identify limited areas where officers are directed to spend some fraction of each shift; they do not direct or reveal the location of each officer at every moment, and they are extremely unlikely to provide a detailed roadmap to the curious criminal.

On the flip side, as detailed above, the public benefits to understanding the workings of this program are significant. The NYPD has touted itself as being the most transparent police department in the world.[9] In fact, as our experience shows, the NYPD has frequently

---

2016), http://www1.nyc.gov/office-of-the-mayor/news/199-16/transcript-mayor-deblasio-police-commissioner-bratton-compstat-2-0#/0 (last visited Oct. 16, 2017).

[7] *Brennan Center for Justice v. New York Police Department*, BRENNAN CTR. FOR JUSTICE (May 19, 2017), https://www.brennancenter.org/legal-work/brennan-center-justice-v-new-york-police-department (linking to the Brennan Center's FOIA request and appeal; the NYPD's denial of the request and denial of appeal; and the legal documents filed in the litigation).

[8] *See* Rachel Levinson-Waldman & Erica Posey, *Predictive Policing Goes to Court*, BRENNAN CTR. FOR JUSTICE (Sept. 5, 2017), https://www.brennancenter.org/blog/predictive-policing-goes-court (While the Brennan Center narrowed its request to exclude the source code as a show of good faith, and to hasten the production of the other records requested, it did not concede that the source code is exempt from disclosure.).

[9] *See* JPat Brown, *Five Examples of the NYPD's Commitment to "Transparency,"* MUCKROCK (June 14, 2017), https://www.muckrock.com/news/archives/2017/jun/14/five-examples-nypd-transparency/.

resisted transparency, requiring groups like the Brennan Center and journalists to expend significant resources in trying to extract information of critical interest to the public.[10] Similarly, little was known about the department's multi-year contract with the data analytics giant Palantir – which was apparently crunching information about arrest records, license-plate reads, parking tickets, and more – until a Buzzfeed article came out this past June.[11] This is why the Brennan Center also supports the POST Act, a bill co-sponsored by Council Members Garodnick and Gibson, which would require the NYPD to publicly report on the surveillance tools it uses and the rules for using them.[12]

In sum, this bill, Int. 1696, would be a groundbreaking measure and a significant step forward in transparency, and would significantly contribute to the NYPD's program of community engagement.[13] The Brennan Center strongly supports its passage. I would be happy to answer any questions or to provide any additional information.

---

[10] *See, e.g.*, Adam Klasfield, *Sound-Cannon Case Heralds E-Transparency for NYPD,* COURTHOUSE NEWS (June 30, 2017), https://www.courthousenews.com/sound-cannons-case-heralds-e-transparency-nypd/; Brown, *supra* note 9.

[11] Emily Hockett & Michael Price, *Palantir Contract Dispute Exposes NYPD's Lack of Transparency,* JUST SECURITY (July 20, 2017, 1:43 PM), https://www.justsecurity.org/43397/palantir-contract-dispute-exposes-nypds-lack-transparency/.

[12] For more on the POST Act, short for Public Oversight of Surveillance Technology Act, see Michael Price, Margot Adams, & Lamya Agarwala, *POST Act Hearing Round-Up,* BRENNAN CTR. FOR JUSTICE (June 21, 2017), https://www.brennancenter.org/blog/post-act-hearing-round-0; *The Public Oversight of Surveillance Technology (POST) Act: A Resource Page,* BRENNAN CTR. FOR JUSTICE (June 12, 2017), https://www.brennancenter.org/analysis/public-oversight-police-technology-post-act-resource-page.

[13] *See, e.g.*, WILLIAM J. BRATTON, THE NYPD PLAN OF ACTION AND THE NEIGHBORHOOD POLICING PLAN: A REALISTIC FRAMEWORK FOR CONNECTING POLICE AND COMMUNITIES (NYPD 2015), *available at* http://home.nyc.gov/html/nypd/html/home/POA/pdf/Plan-of-Action.pdf.

BROOKLYN DEFENDER SERVICES

TESTIMONY OF:

Yung-Mi Lee
BROOKLYN DEFENDER SERVICES

Presented before

The New York City Council Committee on Technology

Hearing on Intro 1696

October 16, 2017

My name is Yung-Mi Lee. I am a Supervising Attorney in the Criminal Defense Practice at Brooklyn Defender Services (BDS). BDS provides multi-disciplinary and client-centered criminal, family, and immigration defense, as well as civil legal services, social work support and advocacy, for over 30,000 clients in Brooklyn every year. I thank the New York City Council Committee on Technology, and in particular Chair James Vacca, for holding this hearing today on Int. 1696, which would establish basic transparency in New York City's automated processing of data for the purposes of targeting services, imposing penalties, or policing.

BDS SUPPORTS Int. 1696

The arrival of the digital age in the criminal legal system has been heralded by technology entrepreneurs, law enforcement leaders, and some academics, but it presents a series of new threats to the liberty and well-being of our clients that warrant deeper investigation. However,

many of these technological advances are deemed proprietary or otherwise kept secret by police, making true accountability all but impossible. At worst, such tools provide a veneer of color- and class-blind objectivity while exacerbating the racial and economic discrimination and other inequalities in law enforcement practices and criminal and civil penalties. From law enforcement's use of facial recognition software that disproportionately misidentifies Black people to so-called gang databases and designations that indefinitely flag people for harsh surveillance or worse, based on who they stand beside in a Facebook photo, apparently with no way to be removed, there are numerous examples of technology reinforcing, rather than mitigating or eliminating, biases that afflict our society as a whole. Two key examples that I will focus on are the rise of pre-trial Risk Assessment Instruments (RAI's) and so-called predictive policing. Int. 1696 will shine a necessary spotlight on these and other areas of the modern surveillance and punishment system.

RAI's and Pre-Trial Detention

Across the United States, nearly a half a million people are detained pre-trial—legally presumed innocent but locked in a cage. The majority of these individuals are legally eligible for release on bail, but detained because courts set bail in an amount and form they cannot afford. Financial conditions of release are, on their face, discriminatory and amplify broader inequalities in society. While attempts at reform have come in cycles for the last several decades, the most onerous forms of money bail remain in use in most of the country. Meanwhile, multinational surety companies have profited from this mass misery through the financing of the bail bonds industry, which is banned in every country except the United States and the Philippines. Because the courts generally only accept bail in cash or commercial bail bond—as opposed to, for example, an unsecured bond—bail bond agents are often a family's only hope for getting a loved one out of jail. These agents can charge exorbitant unrefundable fees, demand unlimited collateral and impose onerous conditions, all with no meaningful oversight by local, state, or federal regulators. The industry siphons billions of dollars from marginalized communities across the country while leaving the majority of people with bail set to suffer in jail.

Understandably, there is a demand for something—anything—different, but policymakers must be deliberate about reform. Specifically, the goal of bail reform must be to reduce pre-trial detention and eliminate racial and other disparities. The zeitgeist in bail reform is the promotion of RAI's to drive decisions about pre-trial detention, but it is not clear this approach will help, rather than harm. RAIs purport to objectively and accurately predict one outcome or another. In reality, RAIs function as a proxy for a series of subjective, human decisions. People decide whether to attempt to measure risk of flight, risk of future criminality, risk of re-arrest, or some combination of the three. People decide what level of offense to attempt to predict, i.e. any offense or a serious offense. People decide which factors to consider in the assessment and how much weight to attribute to each factor in the overall risk score. People then decide what qualitative conclusions to draw from these risk scores, establishing benchmarks for low, medium, and high risks. Finally, judges decide what weight to give the risk assessment when issuing decisions regarding release, supervision, and predictive detention.

In practice, RAIs typically use a series of highly discriminatory metrics that provide little or no utility to seeing the future. Common factors include homelessness, employment status, school enrollment, age, family connections, prior convictions, and prior incarceration. RAI proprietors

argue their tools are not discriminatory because they do not consider demographic information, but this analysis ignores the pre-existing sharp disparities in the aforementioned factors. A landmark ProPublica investigation of RAIs found one commonly used tool was more likely to falsely identify Black people as likely to commit a crime. The investigation also found this RAI to be only "somewhat more accurate than a coin flip" in determining a risk of re-offense, and "remarkably unreliable" in predicting violent crime.

RAIs come with a unique threat to liberty in New York State: a concurrent push to allow judges to make assumptions about dangerousness, using RAIs, in pre-trial detention decisions. Under current state law, judges may only consider a risk of flight, with certain exceptions. While RAIs can be used exclusively to measure this risk, many high-level policymakers, including Mayor de Blasio, are urging changes to the bail statute so that dangerousness may be assessed and considered as well. As such, the first order of business is to stop this rush toward dystopic preventive detention. There is ample evidence that even a few days in jail can be criminogenic; preventive detention is a counterproductive tool of public safety. Moreover, there is no guarantee that adding dangerousness to the statute would significantly reduce jail populations. Results across the country are mixed, and courts in New York City already have comparatively high rates of releasing people on their own recognizance.

In short, RAI's, by their nature, bypass an individual's right to due process and the individualized, case by case, analyses required of prosecutors, judges and defense attorneys.

The transparency in RAIs afforded by this legislation is critical for policymakers and the public to analyze their efficacy and fairness. Many such assessments are currently proprietary. Currently, the Mayor's Office of Criminal Justice Services is engaged in a good-faith effort to improve its pre-trial RAI, and it is critical that it be fully transparent. Transparency requires the release of any and all data used to formulate any RAI. Moreover, the public should have an opportunity to recommend changes before it is implemented.

Importantly, pre-trial detention may not meet the legal definition of a penalty. This legislation should be amended to explicitly include algorithms used to determine custodial detention, incarceration, civil commitment, and supervised release.

There are many better ways to incentivize pre-trial freedom and discourage pre-trial detention, including through expanded use of the unsecured appearance bonds that are already permitted by state. These alternatives must be pursued aggressively. BDS has testified before the Council about bail reform in the past and would be happy to further discuss the issue.

Predictive Policing

Predictive Policing uses algorithms and computer modeling to attempt to predict and prevent crime, including through targeted allocations of resources. In its grudging and incomplete responses to FOIL requests from the Brennan Center for Justice, the NYPD has acknowledge the use of a predictive policing system that was developed in-house as well as a prior purchase of Palantir, a commercial predictive policing product. With both systems, NYPD has stonewalled requests for transparency, citing either trade secrets or vague security concerns. There is a high likelihood that these systems disproportionately impact low-income people of color and other

heavily policed groups, but refusing to disclose, for example, the information inputs and the possible or actual outputs, serves to shield the NYPD from scrutiny. Likewise, the public is prevented from evaluating the system's efficacy and cost-effectiveness. Perhaps resources allocated to identifying a particular housing development and/or certain of its residents as likely sources of crime would be better spent identifying and fulfilling community needs like jobs, affordable and accessible public transit, and quality community-based mental health services.

Int. 1696 will open a window in predictive policing operations and allow us to better evaluate its safeguards against civil rights violations, utility and appropriateness.

The Limits of Transparency

BDS strongly supports the Council's years-long efforts to establish more transparency in the criminal legal system, but we also recognize the limits of this approach. Ultimately, we as a democratic society must retain the ability to direct our law enforcement, not the reverse. Transparency is an important tool of community control, but it should not be mistaken for the endgame for policymakers. As public defenders, it is impossible for us to zealously protect our clients' Constitutional rights without knowing, for example, whether the NYPD officers are parked outside their homes in an x-ray van and how they determined their targets; disclosure of this information is therefore critical but the Council should also explore outright prohibitions on certain domestic spying operations. Likewise, the Council or Comptroller could exert authority to block the purchase of improper and invasive technology used for profiling. Ultimately, the Council must regard law enforcement secrecy as a political tool, in addition to a public safety tool. Without transparency, those of us who urge a shift away from punishment and control toward community support are at an information disadvantage, but we know more than enough from lawsuits and police and civilian recordings to rein in the discriminatory and abusive practices of law enforcement and reinvest in communities.

Thank you for your time and consideration of our comments. If you have any questions, please feel free to reach out to Jared Chausow in our Policy and Advocacy Unit at 718-254-0700 ext. 382 or jchausow@bds.org.

The Bronx Defenders | Redefining public defense.

New York City Council, Committee on Technology
Hearing on the Automated Processing of Data for the Purposes of Targeting Services, Penalties, or Policing to Persons
October 16, 2017

Testimony of The Bronx Defenders,
By Scott Levy

Introduction

My name is Scott Levy. I am Special Counsel to the Criminal Defense Practice at The Bronx Defenders. Thank you for the opportunity to testify today.

Today's hearing is a crucial first step in tackling one of the most pressing issues New York City will face in the coming decades. Computer algorithms -- often developed by third parties and implemented out of the public eye -- are appearing more and more frequently in the criminal justice system and are being used to make and influence ever-more-consequential decisions. There is virtually no transparency or accountability for these data tools.

Nowhere is this truer than in our pretrial detention system. As we speak, the Mayor's Office of Criminal Justice is collaborating with the Criminal Justice Agency and a private consulting firm to develop a next-generation computer algorithm to predict whether people charged with crimes in the City's criminal courts will return to court. This tool will be used by judges in the Bronx and across the City to make hundreds of bail decisions every day, determining whether our clients and other New Yorkers go home to their families and communities or, instead, sit for days, weeks, or months on Rikers Island.

We, along with many in the City, want Rikers closed as soon as possible, but we fear that these algorithms may ultimately lead to *increased* use of pretrial detention and hinder our ability to close Rikers quickly. They will also likely exacerbate existing racial disparities in our criminal justice system. Meaningful transparency and accountability -- and engagement from the City Council -- are absolutely necessary to ensure that the algorithms developed by the Administration do not undermine our commitment to a fairer and more just criminal justice system.

Predictive Algorithms Do Not Guarantee a Decrease in the Rikers Population

New York City already enjoys one of the highest rates of pretrial release in the country. There remains significant work to be done, but we should take care that we do not backslide in our efforts to innovate. Predictive algorithms like the one being developed by the Administration in

no way guarantee decreases in pretrial jail populations. Indeed, they can be used to fill jails just as easily as they can be used to empty them. These algorithms present an enticing but ultimately false promise that we can accurately predict whether an individual will come back to court. We cannot -- and attempts to do so will likely lead to more people sitting in jail while they await trial.

The primary goal of any bail reform effort should be reducing pretrial detention, and we should evaluate any algorithm the Administration plans to introduce by that metric. We believe that over-reliance on computers to make pretrial detention decisions threatens to do real harm to those caught in the criminal justice system by obscuring and undermining our primary objective of decarceration. Predictive algorithms are completely inaccessible to the very people they affect most directly and unaccountable to the public. And they are value- and outcome-neutral -- that is, they cannot reflect shared values of justice, mercy, and compassion, or grapple with a history of racial disparities. The Council can play a vital role in that process by requiring complete transparency and accountability and by insisting that the City adopt a "do no harm" approach to using algorithms in the pretrial justice system.

Predictive Algorithms Inevitably Exacerbate Racial Disparities

Predictive algorithms are only as good as the data that goes into them. Because the data that goes into criminal justice algorithms are tainted by years of racial disparities in arrest and conviction rates, the resulting tools with inevitably reflect and exacerbate pre-existing disparities. This is particularly problematic in light of the fact these tools will never be able to predict an individual's future behavior with any real accuracy. Studies show that computer-generated algorithms will inevitably place more people of color in "high risk" categories, leading to disproportionate rates of pretrial detention and negative case outcomes. As Laurel Eckhouse of the Human Rights Data Analysis Group wrote in a February 2017 Washington Post op-ed: "Inputs derived from biased policing will inevitably make black and Latino defendants look riskier than white defendants to a computer. As a result, data-driven decision-making risks exacerbating, rather than eliminating, racial bias in criminal justice."[1] The Council should take a leading role in preventing this.

Transparency Is Essential for Meaningful Accountability

Requiring transparency in the development and implementation of predictive algorithms in the pretrial detention system is a crucial first step, but it does not ensure the type of meaningful accountability we desperately need. In particular, data transparency *after the fact* -- that is, sharing source code only after a new algorithm has been introduced -- is insufficient. Particularly in the criminal justice system, where individual liberty is at stake and mistakes in algorithms can mean months or years on Rikers Island for presumptively innocent people, City agencies should be required to assess and report on the likely impacts of these algorithms long *before* they are applied to anyone. Earlier this year, the City Council took a step in this direction

[1] Laurel Eckhouse, "Big data may be reinforcing racial bias in the criminal justice system," Wash. Post, Feb. 10, 2017.

by requiring certain agencies to create "equity assessments" to address disparate outcomes on the basis of race, income, gender identity, and sexual orientation.[2] The Council should require the Administration to do similar assessments *prior* to the implementation of any algorithm that will be used to determine or influence whether a person will be deprived of his or her liberty. And there should be a period of public comment to ensure meaningful transparency and accountability.

Moreover, City agencies should not be able to shield these tools from public scrutiny by engaging third parties to create and implement them. Indeed, when these powerful and consequential tools are wielded on behalf of the City by private firms and organizations, the need for transparency and accountability is even greater. Whether created by a City agency or private firm, both the full details and the complete data set(s) used to develop any proposed algorithm must be made public for accountability to be meaningful.

A Caution about "Dangerousness"

Our skepticism and opposition to the unchecked proliferation of computer algorithms in the criminal justice system is colored by the ongoing debate over bail reform at the state level -- in particular, the effort to add considerations of "dangerousness" to the New York's bail statute. It is a point of pride that New York's current bail statute does not allow judges to consider a person's "dangerousness" when making a bail determination. In fact, the State Legislature specifically considered and rejected adding "dangerousness" to the statute in the early 1970's, rightly fearing that allowing judges to consider a person's "dangerousness" would invite judges to indulge in negative racial stereotypes that would disproportionately affect low-income communities of color. New York State is exceptional in its rejection of "dangerousness" considerations in bail determinations. In this light, it is no coincidence that New York City is also a leader in pretrial release. The progress and innovation we have seen in recent years in the City are tied to the exceptional nature of our current bail statute. Adding "dangerousness" to the state bail statute would represent a significant step in the wrong direction.

The concerns we have raised about computer-generated algorithms in the pretrial justice system would be magnified if "dangerousness" were added to the bail statute. Algorithms that purport to predict a person's dangerousness would not only give license to implicit racial bias and exacerbate existing racial disparities, but would inevitably increase the City's jail population. And they would be virtually impenetrable to the tens of thousands of people subject to them every year. When individual liberty is at stake, our system demands careful, thoughtful, and individualized consideration, not unquestioning deference to computer-generated risk scores. We hope that the Council will join us in opposition of "dangerousness" to New York's bail statute.

Thank you again for the opportunity to testify before you today.

---

[2] *See* Int. No. 1500-B.

Good afternoon!

My name is Julia Stoyanovich, I am a resident of New York City (District 7). I hold a Ph.D. in Computer Science from Columbia University. I am an Assistant Professor of Computer Science at Drexel University in Philadelphia, and an affiliated faculty at the Center for Information Technology Policy at Princeton University. In my research and teaching, I focus on data management and data science topics, including algorithmic ethics: fairness, accountability and transparency. I am also the founder of the *Data, Responsibly* consortium.

My statement is based on conversations with Ellen P. Goodman (Professor of Law at Rutgers University), Serge Abiteboul (Researcher at INRIA and Distinguished Professor at École Normale Supérieure, Paris, France) and Bill Howe (Associate Professor at the Information School at the University of Washington).

I would like to commend Councilman Vacca on sponsoring an ambitious bill on algorithmic transparency. Transparency of algorithms that are used in the public sector refers to making explicit the design and policy choices these algorithms embed. Transparency of digital governance is essential because it enables accountability to the public, facilitates public debate about policy, and helps move our democracy forward.

However, it is my belief that the bill under discussion requires significant improvement to achieve its intended goal. In my statement, I will focus on three critical shortcomings of the bill, namely that:

1. algorithmic transparency cannot be achieved without data transparency;
2. results received by the user by interacting with the system must be made interpretable;
3. enacting transparency will require significant technological effort on the part of the agencies, for which more time will be necessary than is currently provisioned.

I now briefly discuss each of these points in turn, and conclude with a set of recommendations.

My first point relates to the first part of the proposed amendment: "publish on such agency's website the source code of such system." While making source code publicly available is a significant step towards transparency (as long as the posted code is readable, well-documented and complete), **meaningful transparency of algorithmic processes cannot be achieved without transparency of data.**

In the case of predictive analytics, data is used to customize algorithm behavior - this is called "training." The same algorithm may exhibit radically different behavior -- make different predictions; make a different number of mistakes, and even different kinds of mistakes -- when trained on two different datasets. In other words, without access to training data, we cannot know how a predictive analytics method will actually behave. Algorithms of this kind are used, for example, in predictive policing software.

Other decision-making algorithms, including, for example, scoring methods like the VI-SPDAT, which is used to prioritize homeless individuals for receiving services, and matchmaking methods such as those used by the Department of Education to assign children to spots in public schools, do not explicitly attempt to predict future behavior based on past behavior. Yet, these algorithms also rely on data in important ways: they are designed and validated using data.

What do we mean by data transparency? One immediate interpretation of this term is -- making the training and validation datasets publicly available. However, while data should be made open whenever possible, much of it is sensitive and cannot be shared directly. That is, data transparency is in tension with the privacy of individuals who are included in the dataset.

An alternative interpretation of data transparency is as follows: In addition to releasing training and validation datasets whenever possible, agencies shall make publicly available information about the data collection and pre-processing methodology, in terms of assumptions, inclusion criteria, known sources of bias, and data quality. Agencies shall make publicly available summaries of statistical properties of the datasets, while using state-of-the-art methods to preserve the privacy of individuals. When appropriate, privacy-preserving synthetic datasets can be released in lieu of real datasets, if real datasets are sensitive and cannot be released to the public.

My second point relates to part 2 of the proposed bill: "permit a user to (i) submit data into such system for self-testing and (ii) receive the results of having such data processed by such system." **To facilitate transparency, the result of the self-test program should be interpretable, insightful and actionable.** For example, suppose that software is used to score and rank individuals for access to a service. If a user enters her data and receives the result -- a score of 42 -- this will not explain to the user why she was scored in this way, how she compares to others, and what she can do to potentially improve her outcome.

Establishing appropriate result presentation methodology that supports interpretability will require a deep understanding of the technical and policy context on the part of the agency. As part of the result, data that pertains to other individuals, or a summary of such data, may need to be released to the user, for example, to explain which users, or groups of users, receive a higher score, or a better outcome. This functionality requires data transparency mechanisms discussed above.

Further, when a user receives a result, she must be able to challenge it by submitting a request for additional explanation, or correction, to the agency.

Finally, in addition to allowing individual users to interrogate the system, it is important to establish an auditor role in support of systematic verification. An auditor may be granted access to more data than what the general public is allowed to see, and will have a sufficient level of technical expertise to test software for properties like robustness, correctness and non-discrimination with respect to legally protected groups.

My third point is brief, and relates to paragraph 2 of the amendment "this local law takes effect 120 days after it becomes law." Enacting this amendment will require

significant technological effort on the part of the agencies. It will require careful planning, financial resources and time. As an illustration of two recent public actions of a similar nature: the French Digital Republic Act came into effect on October 7, 2016, following a year-long process, while the EU General Data Protection Regulation (GDPR) was adopted on April 27, 2016 and will become enforceable on May 25, 2018, more than two years later.

In summary, I recommend:

1. that data transparency be considered in this amendment as an integral part of algorithmic transparency;
2. that users be provided interpretable self-testing results, and have an option to request additional explanation or correction; and
3. that a realistic plan for enactment of the amendment be put in place, with a longer timeline.

Thank you for your attention!

Julia Stoyanovich
stoyanovich@drexel.edu
www.dataresponsibly.com

CENTER FOR DEMOCRACY & TECHNOLOGY

October 16, 2017

Chairman James Vacca
New York City Council Committee on Technology
250 Broadway Suite 1749
New York, NY 10007

Attn: Zach Hecht, zhecht@council.nyc.gov

Re: Committee Meeting on Automated Processing of Data for the Purposes of Targeting Services, Penalties, or Policing to Persons, October 16, 2017.

Dear Chairman Vacca,

On behalf of the Center for Democracy & Technology (CDT),[1] I write to offer recommendations for the City of New York to govern the algorithms it uses to make decisions affecting New Yorkers. Agencies at all levels of government are turning to automation and machine-learning algorithms to help make decisions that affect individuals' rights and access to resources. In New York City, computer algorithms have been used to assign children to public schools,[2] rate teachers,[3] target buildings for fire inspections,[4] and make policing decisions.[5] These algorithms can process large amounts of data and uncover patterns or insights to drive decision-making. However, they are not neutral decision makers.

When governments use algorithms to make or assist with decisions, those algorithms become public policy, subject to public oversight.[6] This is true regardless of whether the algorithm is created by a government agency or a private vendor. The City of New York has an obligation to understand, scrutinize, and explain how its algorithms make decisions affecting New Yorkers.

At minimum, the city should ensure and demonstrate to the public that NYC's algorithmic decision-making tools (1) are aligned with the city's policy goals and the public interest; (2) work as intended; (3) do not use data to

[1] The Center for Democracy & Technology (CDT) is a non-profit 501(c)(3) organization dedicated to protecting digital rights and the free and open internet. CDT's Digital Decisions project advocates for more thoughtful and equitable approaches to big data and automation ((https://cdt.org/issue/privacy-data/digital-decisions/). Our Digital Decisions tool is designed to help engineers and policy makers assess and surface potential bias in algorithms (https://cdt.org/blog/digital-decisions-tool/).

[2] Amy Zimmer, *High Schools Dole Out Misinformation About Admissions Process, Parents Say*, DNAInfo (Nov. 15, 2016), https://www.dnainfo.com/new-york/20161115/kensington/nyc-high-school-admissions-ranking.

[3] Cathy O'Neil, *Don't Grade Teachers with a Bad Algorithm*, Bloomberg (May 15, 2017), https://www.bloomberg.com/view/articles/2017-05-15/don-t-grade-teachers-with-a-bad-algorithm.

[4] *Mayor Bloomberg and Fire Commissioner Cassano Announce New Risk-based Fire Inspections Citywide Based on Data Mined from City Records*, NYC.gov (May 15, 2013), http://www1.nyc.gov/office-of-the-mayor/news/163-13/mayor-bloomberg-fire-commissioner-cassano-new-risk-based-fire-inspections-citywide#/6.

[5] *See* Brennan Center for Justice, *Brennan Center for Justice v. New York City Police Department*, brennancenter.org (May 19, 2017), https://www.brennancenter.org/legal-work/brennan-center-justice-v-new-york-police-department.

[6] *See generally, e.g.*, Robert Brauneis & Ellen P. Goodman, *Algorithmic Transparency for the Smart City*, Yale J. L. & Tech. (forthcoming), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3012499&download=yes.

marginalize minority or vulnerable populations and exacerbate inequality; (4) provide meaningful transparency to New Yorkers so that they can appeal and seek remedy for automated decisions that are incorrect, unjust, or contrary to law.

1. **The City of New York is responsible for ensuring that its algorithmic decision-making is aligned with the city's policy goals and the public interest.**

Agencies often rely on third parties to develop algorithms for use in the public sector.[7] Although these algorithms may be developed and maintained by private entities, their judgments still represent public policy. Public officials must be able to evaluate these models to ensure that they serve the City's purposes and the public's interest.

For example, city officials must decide how to distribute error in criminal justice algorithms. Many jurisdictions use risk assessment tools to help make decisions about people in the criminal justice system based on the projected likelihood that those people will commit future crimes.[8] These decisions can range from allocating resources to selecting parole candidates to determining sentences. Each algorithm will produce some error, but city officials must make policy decisions about the relative cost of false negatives (falsely classifying a high-risk individual as low-risk) versus false positives (falsely classifying a low-risk individual as high-risk).[9] These decisions must consider the type of prediction being made (e.g. violent crime versus non-violent crime), the consequences of a high-risk prediction (e.g. counseling versus a longer prison sentence), and the context in which the tool is being used (e.g. a trial versus an in-home social worker visit). This judgment will always require balancing of competing values, such as the desire to minimize risk of crime and the goal of giving each person an opportunity for rehabilitation. Policy makers must engage in careful balancing and not outsource policy decisions to vendors.

2. The City must ensure that its algorithms work as intended.

There is no shortage of companies ready to license their automated tools to government agencies, and city officials must be prepared to evaluate whether those tools actually meet the city's needs. For example, the United States Department of Agriculture Food and Nutrition Service (FNS) has recommended that states use web-based automated tools to monitor illegal attempts to sell or solicit SNAP benefits online.[10] However, a Government Accountability Office (GAO) test of these tools found that they were impractical for detecting fraudulent social media posts because of technological limitations.[11] The tools could not detect geographic location information in posts, so states could not limit their searches to their jurisdictions, and the tools also

---

[7] *See generally, e.g., Id.*
[8] *See, e.g.*, Julia Angwin et al., *Machine Bias*, ProPublica (May 23, 2016), https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.
[9] *See* Brauneis & Goodman, *supra* note 6, at 12-13.
[10] Gov. Accountability Office, GAO-14-641, Enhanced Detection Tools and Reporting Could Improve Efforts to Combat Recipient Fraud, Report to Ranking Member, Comm. on the Budget (2014), http://www.gao.gov/assets/670/665383.pdf.
[11] *Id.*

used search methods that were not supported by social media platforms.[12] Ultimately, the tools were significantly outperformed by manual searches for SNAP fraud.[13] Before purchasing, recommending, or requiring the adoption of automated tools, city officials must ask whether the types of analysis those tools perform, and their technical capabilities, suit the city's needs.

3. The City should avoid using data in ways that marginalize vulnerable populations and exacerbate inequality.

Algorithms use the examples in training data to make decisions or predictions in new cases. If the training data represents discrimination on the basis of race, gender, or other class distinctions, the resulting model may learn to invidiously discriminate. This has been well-documented in the criminal justice context, where algorithms are typically trained on police records reflecting law enforcement bias and disproportionate arrests and incarceration of black Americans.[14] Some algorithms have been found to produce less accurate results for people of color than for whites, possibly because people of color were underrepresented in the training data. This includes facial recognition algorithms used by law enforcement[15] as well as commercial tools for processing social media posts.[16]

It's imperative that city officials understand the data used to train public-sector algorithms, where the data comes from, and how it might represent bias. Officials should also test—independently or with vendors—for potential discriminatory effects. If testing is conducted by the vendor, city officials should obtain documentation of how the tests were conducted, what potential biases were uncovered, and how the model was adjusted to mitigate bias.

4. The City should provide meaningful transparency to New Yorkers about how it uses algorithms to make decisions.

While most government policy is found in documents that the public can access and evaluate, policy contained in algorithms is often shrouded by trade secrets and hidden from public scrutiny. For example, like many states and localities, both New York State and New York City have adopted the "Value Added Model" (VAM) for

---

[12] *Id.* at 29–30.
[13] *Id.*
[14] *See, e.g.*, Angwin et al., *supra* note 8; Julia Angwin and Jeff Larson, *Bias in Criminal Risk Scores is Mathematically Inevitable, Researchers Say*, ProPublica (Dec. 30, 2016), https://www.propublica.org/article/bias-in-criminal-risk-scores-is-mathematically-inevitable-researchers-say.
[15] *See* Claire Garvie, Alvaro M. Bedoya & Jonathan Frankle, Georgetown Law Center on Privacy & Technology, The Perpetual Lineup: Unregulated Police Face Recognition in America, 53-57 (Oct. 18, 2016), https://www.perpetuallineup.org/sites/default/files/2016-12/The%20Perpetual%20Line-Up%20-%20Center%20on%20Privacy%20and%20Technology%20at%20Georgetown%20Law%20-%20121616.pdf.
[16] *See* Su Lin Blodgett and Brendan O'Connor, *Racial Disparity in Natural Language Processing: A Case Study of Social Media African-American English*, 2017 Proceedings of the Fairness, Accountability & Transparency in Machine Learning Conference, https://arxiv.org/pdf/1707.00061.pdf.

evaluating and scoring teacher performance.[17] Law Professors Robert Brauneis and Ellen P. Goodman submitted a public records request to both the city and state to obtain information about the models.[18] While the city sent several letters stating that it needed more time to respond to the request, the state released a small number of sample outputs—not enough to understand or evaluate the model.[19] The contract between the New York State Education Department and the model's vendor, the American Institute of Research, provided that the "methodologies or measures" provided by the contractor were "proprietary information" and could not be disclosed by the Education Department.[20] These broad trade secret provisions are common in government contracts for algorithmic tools and circumvent the traditional transparency function of open records laws.[21]

The City of New York can take several steps to provide useful information to New Yorkers about how algorithms carry out public policy. When city agencies license algorithms from third-party vendors, they should require the vendors to document how the algorithms work, the data they are trained on, the variables they consider, their accuracy and error distribution, how the algorithms have been tested and the results of those tests, and the steps the vendor has taken to mitigate invidious discrimination by algorithms. City officials should also push back against overly broad trade secret protection so that more information about public-sector algorithms can be obtained through public records requests or made available by the city.

When algorithmic decisions affect people's fundamental rights or vital interests (such as financial interests), the city should be able to provide meaningful information about why the decision was made (e.g., what variables were material to the decision) so that people can effectively challenge decisions and seek remedies for harm.

I would like to thank the Committee for addressing this important issue and for considering these recommendations. Please reach out to me if with any questions or for assistance with future work on this issue.

Sincerely,

Natasha Duarte

Natasha Duarte, Policy Analyst
Center for Democracy & Technology
1401 K Street NW Suite 200
Washington, D.C. 20005
202.407.8822
natasha@cdt.org

[17] *See* Brauneis & Goodman, *supra* note 6, at 37–38.
[18] *Id.*
[19] *Id.*
[20] *Id.*
[21] *See* Taylor R. Moore, Center for Democracy & Technology, *Trade Secrets & Algorithms as Barriers to Social Justice* (2017), https://cdt.org/files/2017/08/2017-07-31-Trade-Secret-Algorithms-as-Barriers-to-Social-Justice.pdf.

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☒ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Noel Hidalgo

Address: _____

I represent: BETA NYC

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☐ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Craig Campbell

Address: _____

I represent: Mayor's Office of Data Analytics

Address: 100 Gold St, 2nd Fl

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696-2017 Res. No. _____

☒ in favor ☐ in opposition

Date: 10/16/2017

(PLEASE PRINT)

Name: Charlie Moffett

Address: _____

I represent: Myself

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☒ in favor ☐ in opposition

Date: 10/16/18

(PLEASE PRINT)

Name: Josh Norkin & Julie Fry

Address: 199 Water St. New York, NY

I represent: The Legal Aid Society

Address: 199 Water St. New York, NY

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☑ in favor ☐ in opposition

Date: 10/12/2017

(PLEASE PRINT)

Name: Bert Muthalaly

Address: 86 Hoyt Street

I represent: Myself

Address: n/a

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☑ in favor ☐ in opposition

Date: 10/10/17

(PLEASE PRINT)

Name: William Brinfield

Address: 86 Milton St. Brooklyn NY 11222

I represent: myself

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☑ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Rashida Richardson

Address: _____

I represent: New York Civil Liberties Union

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☐ in favor ☑ in opposition

Date: 10/16/2017

(PLEASE PRINT)

Name: Jaline Sauassarian

Address: _____

I represent: Tech:NYC

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Dr. Julia Powles

Address: _____

I represent: Cornell Tech

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☑ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Yung-Mi Lee

Address: ~~B~~ 177 Livingston St. Brooklyn NY

I represent: Brooklyn Defender Services

Address: 177 Livingston St. Brooklyn NY 11201

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☑ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Scott Levy

Address: ~~B~~

I represent: ~~Bron~~ The Bronx Defenders

Address: 360 E 161st St. Bx NY

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696 Res. No. _____

☒ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Julia Stoyanovich

Address: 501 W 123 St 6D 10027

I represent: Data, Responsibly

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696-2017 Res. No. _____

☑ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Rachel Levinson-Waldman

Address: 1140 Connecticut Ave. NW Washington DC 20036

I represent: Brennan Center for Justice

Address: 120 Broadway, New York, NY

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696-2017 Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: [illegible]

Address: [illegible]

I represent: [illegible]

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1696-2017 Res. No. _____

☑ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Alexander Krupp

Address: 601 Pelham Parkway N. #505

I represent: _____

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1641 Res. No. _____

☐ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Dan Sunderland

Address: 2 Metrotech Ctr 4th Flr

I represent: DoITT

Address: 2 Metrotech Center

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1641 2017 Res. No. _____

☒ in favor ☐ in opposition

Date: 10/16

(PLEASE PRINT)

Name: Alexander Fich

Address: 1404 Pacific St. Apt 4A
Brooklyn, NY 11216

I represent: _____

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☐ in opposition

Date: 10/16/17

(PLEASE PRINT)

Name: Rodrick Wallace

Address: 555 Kappock St. Bx 10463

I represent: N/A

Address: _____

Please complete this card and return to the Sergeant-at-Arms