

SPECIAL SECTION

CAUSE OF DEATH

QUALITY IMPROVEMENT INTERVENTION

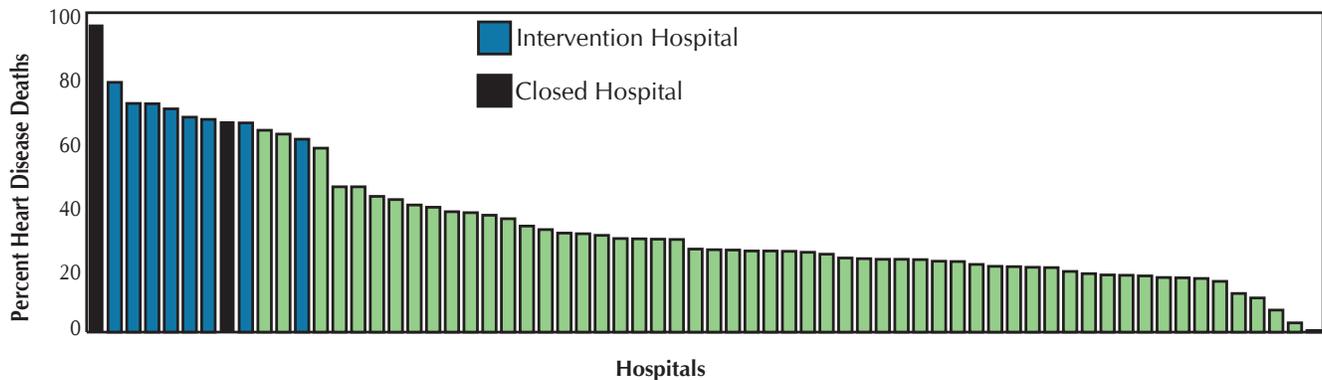
The purpose of this special section is to highlight the effects of a recent data quality improvement initiative on the 2010 mortality data presented in this summary. Future publications will describe the impact of this initiative in more detail.

The Data Quality Issue

- A blinded review of NYC death certificates and medical records revealed overreporting of heart disease as the cause of death (Agarwal R, Norton JM, et al. Over-reporting of deaths from coronary heart disease in New York City hospitals, 2003. *Prev Chronic Dis* 2010; 7(3)).
 - Heart disease was overreported as a cause of death by 91% overall and increased with decedent age: 51% among those 35–74 years, 94% for 75–84 years, and 137% for ≥85 years.
- In 2008, the New York City (NYC) Bureau of Vital Statistics examined overreporting in NYC hospitals and found tremendous variability in the proportions of deaths reported from coronary heart disease (Figure SS1).

The 2009 Intervention

Figure SS1. Percent of Death Certificates Reporting Heart Disease as Cause of Death, New York City, 2008



- Between June 2009 and January 2010, the Bureau of Vital Statistics initiated a hospital-level intervention to improve the accuracy of cause of death reporting on the death certificate at 8 NYC hospitals with a high percentage of deaths reported as due to heart disease. These 8 hospitals reported 8.5% of NYC deaths. The very high proportions of heart disease deaths in the targeted hospitals served as justification for the intervention.
- The intervention had the following components:
 - A conference call initiated the intervention with senior hospital staff including Medical Directors. Hospital-specific heart disease death data were presented in the context of NYC hospital heart disease deaths (e.g. Figure SS1) and the Agarwal et. al publication.
 - Hospitals were required to supply a death certification/registration workflow and hospital clinical staff conducted an audit of a random sample of death certificates
 - Hospitals were asked to promote the *Improving Cause of Death Reporting* E-learning (<http://www.nyc.gov/html/doh/media/video/icdr/index.html>) to all staff participating in the certification/registration workflow.
 - An on-site in-service concluded the intervention. It incorporated hospital-specific death certification/registration workflow and audit results, as well as an interactive discussion on proper cause of death reporting.

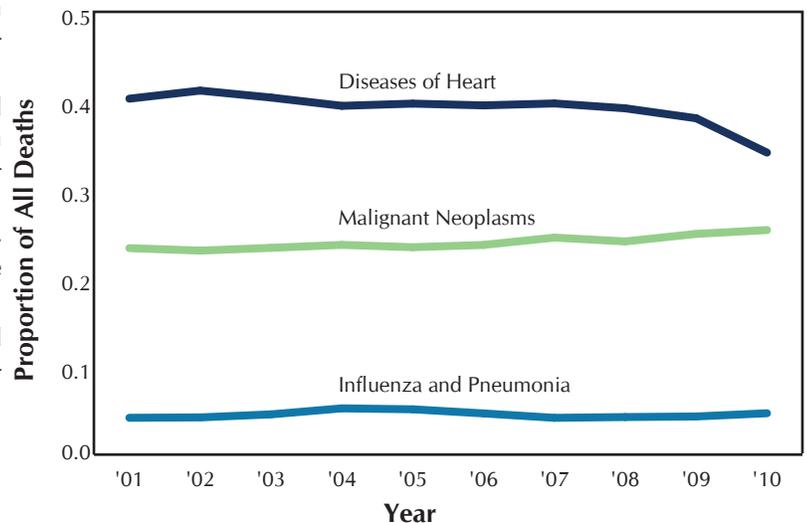
Citywide Results of Intervention on Leading Causes of Death

Table SS1. Counts and Proportions of 5 Leading Causes of Death and Changes from Prior Year, New York City, 2006-2010

Cause of Death	2006	2007	2008	2009	2010
Diseases of the Heart					
Annual Death Count	21,844	21,442	21,192	20,086	17,929
Proportion of All Deaths	39.4	39.7	39.1	38.0	34.1
% Change in Proportion from Prior Year	-0.5	0.6	-1.4	-2.9	-10.2
Malignant Neoplasms					
Annual Death Count	13,116	13,251	13,047	13,180	13,333
Proportion of All Deaths	23.7	24.5	24.1	24.9	25.4
% Change in Proportion from Prior Year	1.1	3.5	-1.8	3.5	1.7
Influenza and					
Annual Death Count	2,578	2,247	2,300	2,278	2,457
Proportion of All Deaths	4.7	4.2	4.2	4.3	4.7
% Change in Proportion from Prior Year	-9.1	-10.7	2.1	1.5	8.5
Diabetes Mellitus					
Annual Death Count	1,708	1,560	1,643	1,690	1,711
Proportion of All Deaths	3.1	2.9	3.0	3.2	3.3
% Change in Proportion from Prior Year	-2.9	-6.4	5.1	5.4	1.8
Chronic Lower					
Respiratory Diseases					
Annual Death Count	1,385	1,427	1,605	1,529	1,716
Proportion of All Deaths	2.5	2.6	3.0	2.9	3.3
% Change in Proportion from Prior Year	-9.7	5.5	12.2	-2.4	12.9

- Citywide, the proportion of death certificates reporting heart disease as the cause of death decreased 12.8% after the intervention began in mid-2009, from 0.391 in 2008 to 0.341 in 2010 (Table SS1).
- This decrease in heart disease death reporting between 2008 and 2010 was accompanied by a 5.3% to 10.2% increase in the proportions of death certificates reporting other leading natural causes of death (Table SS1).

Figure SS2. Proportion of Death Certificates Reporting Diseases of Heart, Malignant Neoplasms (Cancer), and Influenza/Pneumonia as Cause of Death, New York City, 2001-2010



- The initiation of the intervention in 2009 coincides with changes in the proportions of deaths due to the top three leading causes of death.
- The proportions of deaths due to heart disease decreased markedly after 2008 from 0.391 to 0.341 in 2010. Between 2001 and 2008, this proportion was consistently higher, between 0.391 and 0.411.
- The proportion of deaths due to a cancer reached 0.254 in 2010, higher than any other year in the past decade. The previous high was 0.245 in 2007.
- The proportion of influenza/pneumonia deaths increased to 0.047 per 100 deaths in 2010, reaching the same proportion as 2006.

Figure SS3. Percent Change in the Proportion of Death Certificates Reporting Heart Disease as the Cause of Death by Community District of Residence, New York City, 2008-2010

- The location of intervention hospitals led to geographic variation in changes in heart disease deaths over time, which may explain the differential impact by race/ethnicity and other variables that differ by neighborhood (SS4).

- Twelve Community Districts (CDs) were in the quintile with the greatest percent decrease in the proportion of heart disease deaths (18.5–39.1%); nearly all were located in Brooklyn or Queens.

- Brooklyn was home to 4 of the 8 intervention hospitals, and 8 of the 18 Brooklyn CDs were in the quintile with the greatest decrease.

- Queens was home to 2 of the 8 intervention hospitals, and 3 of the 14 Queens CDs were in the quintile with the greatest decrease.

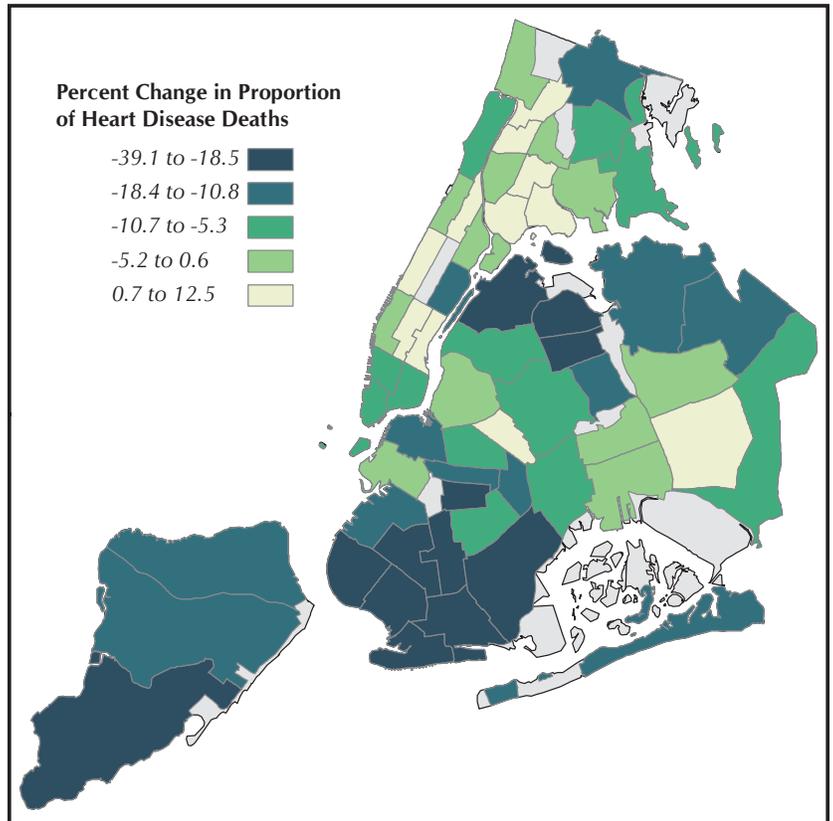
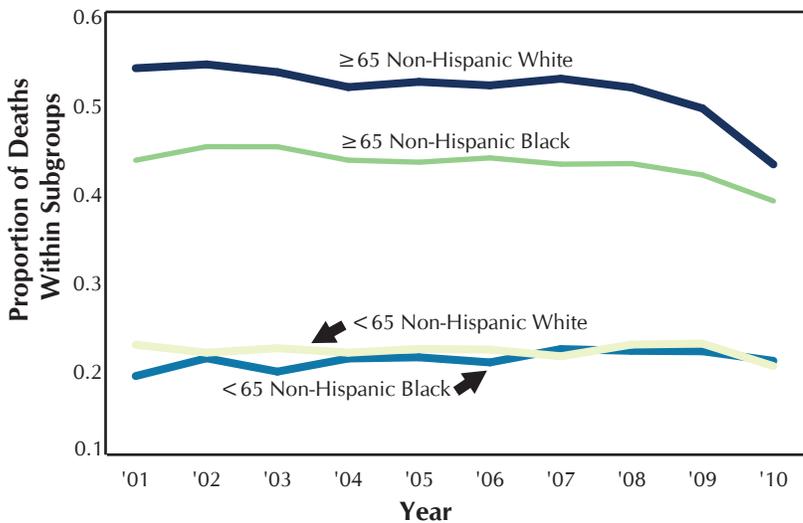


Figure SS4. Proportion of Deaths Due to Diseases of the Heart by Age and Racial/Ethnic Group, New York City, 2001-2010



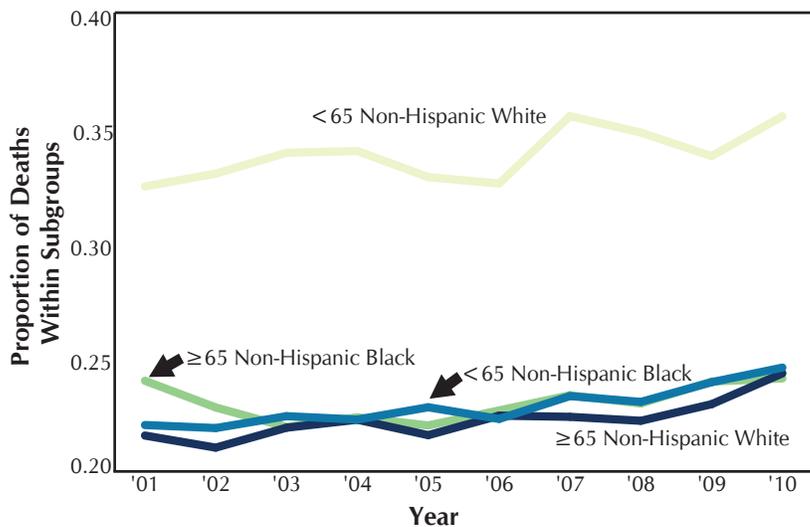
- The proportion of heart disease deaths decreased more among non-Hispanic whites than non-Hispanic blacks, which may impact trends in black/white health disparities measures.

- Older (≥ 65 years) non-Hispanic white decedents demonstrated a greater decrease in the proportion of deaths attributed to heart disease between 2008 and 2010 than older non-Hispanic blacks (16.9% versus 9.8%, respectively).

- Among younger (<65 years) decedents, the 2008–2010 decrease in the proportion of deaths was also greater among non-Hispanic whites (10.9%) than non-Hispanic blacks (5.2%).

- Demographic differences among the populations served by the intervention hospitals likely explain the variable magnitude of change by ethnicity and age. We do not report changes in other population subgroups because of small counts.

Figure SS5. Proportion of Deaths Due to Malignant Neoplasms (Cancer) by Age, Sex, and Racial/Ethnic Group, New York City, 2001-2010



- Deaths incorrectly reported as heart disease prior to the intervention were distributed among other causes of death post-intervention potentially obscuring mortality trends. In the case of cancer, the magnitude of the resulting increase varied among subgroups.
 - As the proportion of heart disease deaths decreased among all age-race subgroups between 2008 and 2010, the proportion of deaths attributed to cancer increased in all subgroups.
 - The greatest percent increase in cancer (2.1%) was among older (≥ 65 years) white non-Hispanics, the subgroup with the greatest decrease in heart disease deaths.
 - Younger (<65 years) black non-Hispanics, who demonstrated the smallest decrease in heart disease deaths, demonstrated the second greatest percent increase in cancer (1.5%).

Summary and Implications of Mortality Data Trends

- As cause of death reporting improves, long-term trends in mortality data may be obscured, particularly when comparing subgroups differentially affected by the cause of death quality interventions.
- In particular, health researchers may notice an impact on race/ethnicity, hospital-level, and neighborhood mortality rate analyses.

Ongoing Efforts to Improve the Accuracy of Cause of Death Reporting

- Beginning in January 2010, the NYC health code requires all users of the electronic death registration system (EDRS) to complete an on-line course that teaches the principles of cause of death determination.
- In 2011, the Bureau of Vital Statistics completed a second phase of its hospital-level interventions to improve the accuracy of cause of death reporting, reaching 12 additional hospitals.
- Physician pocket cards and a hospital poster were developed and disseminated as a part of the second phase of the intervention.

More information on NYC's cause of death improvement efforts are available at:
<http://www.nyc.gov/html/doh/html/vs/vs-cod-quality.shtml>