

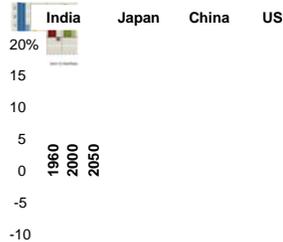
## Opportunities for Research Collaboration and Training

K Pass  
Wadsworth Center  
NYS Dept Health

## Unique Advantages in NBS

- ✦ Residual specimens usually available
- ✦ Unbiased sample of population
- ✦ Historical specimens often available
  - ✦ Depending on storage conditions:
    - Proteins
    - DNA

Change in population from previous decade



Source: US Census Bureau

## Studies at Wadsworth Center

- ✦ 1979 Three Mile Island event
- ✦ 1987 HIV seroprevalence
- ✦ 1998 DNA extraction procedure
- ✦ 2000 Multiplex testing on the Luminex system
- ✦ 2004 Gene frequency studies
- ✦ 2005 Folate related birth defects

## Three Mile Island event 1979



### Fact Sheet

United States Nuclear Regulatory Commission  
Office of Public Affairs  
Washington DC 20555  
Telephone: 301/415-8200 E-mail: opa@nrc.gov

#### The Accident At Three Mile Island

The accident at the Three Mile Island Unit 2 (TMI-2) nuclear power plant near Middletown, Pennsylvania, on March 28, 1979, was the most serious in U.S. commercial nuclear power plant operating history(1), even though it led to no deaths or injuries to plant workers or members of the nearby community. But it brought about sweeping changes involving emergency response planning, reactor operator training, human factors engineering, radiation protection, and many other areas of nuclear power plant operations. It also caused the U.S. Nuclear Regulatory Commission to tighten and brighten its regulatory oversight. Resultant changes in the nuclear power industry and at the NRC had the effect of enhancing safety.

#### Health Effects

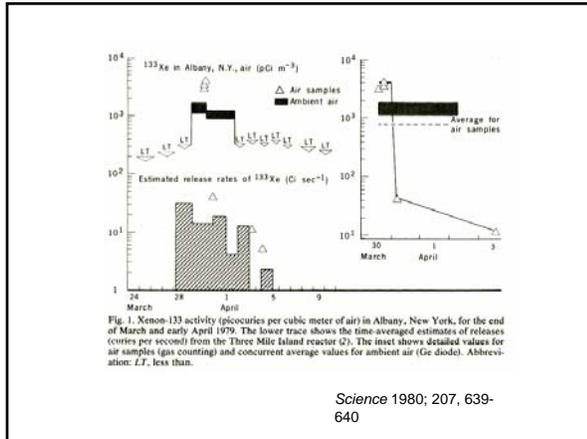
Detailed studies of the radiological consequences of the accident have been conducted by the NRC, the Environmental Protection Agency, the Department of Health, Education and Welfare (now Health and Human Services), the Department of Energy, and the State of Pennsylvania. Several independent studies have also been conducted. Estimates are that the average dose to about 2 million people in the area was only about 1 millirem. To put this into context, exposure from a full set of chest x-rays is about 6 millirem. Compared to the natural radioactive background dose of about 100-125 millirem per year for the area, the collective dose to the community from the accident was very small. The maximum dose to a person at the site boundary would have been less than 100 millirem.

In the months following the accident, although questions were raised about possible adverse effects from radiation on human, animal, and plant life in the TMI area, none could be directly correlated to the accident. Thousands of environmental samples of air, water, milk, vegetation, soil, and foodstuffs were collected by various groups monitoring the area. Very low levels of radionuclides could be attributed to releases from the accident. However, comprehensive investigations and assessments by several well-respected organizations have concluded that in spite of serious damage to the reactor, most of the radiation was contained and that the actual release had negligible effects on the physical health of individuals or the environment.

**“Detailed studies of the radiological consequences of the accident have been conducted by the NRC..... Estimates are that the average dose to about 2 million people in the area was only about 1 millirem.”**

## Wadsorth's Role

- Mapped airflow
- Retrieved specimens (later) from infants born to mothers who would have been pregnant at the critical development time

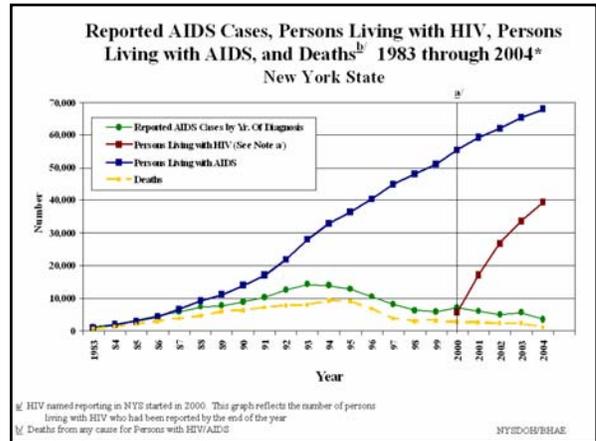


A search for airborne  $^{131}\text{I}$  showed measurable activity, even though this was analyzed by a highly sensitive coincidence counting method (5). A search for airborne  $^{131}\text{I}$  showed no measurable activity...

Radioactive Plume from the Three Mile Island Accident: Xenon-133 in Air at a Distance of 375 Kilometers  
 Martin Wahlen; Charles O. Kunz; John M. Matuszek; William E. Mahoney; Roger C. Thompson  
 Science 1980; 207, 639-640.

## HIV seroprevalence 1987

- Tested residual dried blood specimens for presence of antibodies to HIV
- Retained only:
  - Gender
  - Zipcode
  - Mother's age



**Persons Living with HIV and AIDS and Cumulative AIDS Cases\***  
New York State

| Region of Residence at Time of Diagnosis | Living with HIV Infection | Living with AIDS | Cumulative AIDS Cases |
|--|---------------------------|------------------|-----------------------|
| Albany Region                            | 1,538                     | 1,907            | 3,951                 |
| Binghamton Region                        | 150                       | 179              | 356                   |
| Bronx                                    | 7,120                     | 11,885           | 28,102                |
| Brooklyn                                 | 7,203                     | 14,398           | 35,767                |
| Buffalo Region                           | 1,259                     | 1,527            | 3,173                 |
| Lower Hudson Region                      | 1,283                     | 2,759            | 6,082                 |
| Manhattan                                | 10,084                    | 17,668           | 47,357                |
| Mid Hudson Region                        | 1,139                     | 1,962            | 4,389                 |
| Nassau/Suffolk Region                    | 1,473                     | 3,058            | 7,584                 |
| Queens                                   | 3,643                     | 8,210            | 18,712                |
| Rochester Region                         | 1,035                     | 1,379            | 2,891                 |
| Statens Island                           | 579                       | 1,026            | 2,744                 |
| Syracuse Region                          | 1,251                     | 1,647            | 3,205                 |
| <b>Total</b>                             | <b>37,757</b>             | <b>67,605</b>    | <b>164,313</b>        |

\*Only regions outside of NYC include cases identified as prisoners since the majority of prisoners are diagnosed in state correctional facilities which are located outside NYC  
NYSDOH/BHAE

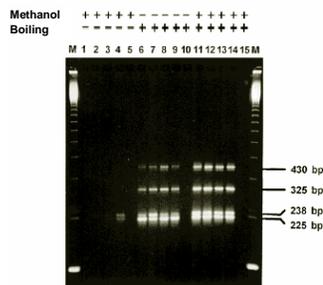
## DNA extraction procedure 1998

*Rapid, Efficient Method for Multiplex Amplification From Filter Paper*

CAGGANA ET AL. HUMAN MUTATION 11:404.409 (1998)

Michele Caggana,\* James M. Conroy, and Kenneth A. Pass  
Division of Genetic Disorders, New York State Department of Health,  
Albany, New York 12201-0509

FIGURE 1. Multiplex PCR products varying purification conditions. Blood spots from Guthrie cards (1mm) were punched and treated as described in Materials and Methods. Lanes 1,5 methanol treatment only; lanes 6,10 boiling only; and lanes 11,15 methanol/boiling. M is a 123 bp ladder (Sigma). DNA blanks are in lanes 5, 10, and 15.



## Multiplex testing on the Luminex system 2000

Multiplexed Genotyping of beta-Globin Variants from PCR -amplified Newborn Blood Spot DNA by Hybridization with Allele-specific Oligodeoxynucleotides Coupled to an Array of Fluorescent Microspheres

Clin Chem. 46(7):1-3, 2000

Robert J. Colinas, Ronald Bellisario, and Kenneth A. Pass

Division of Genetic Disorders, Wadsworth Center  
New York State Department of Health  
Albany, NY.

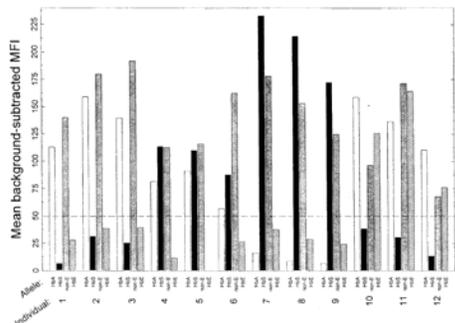


Fig. 1. Five bead classifications, each coupled to one of four b-globin allele-specific ODNs or a NS ODN, were hybridized to biotinylated PCR-amplified newborn dried blood spot DNAs, labeled with streptavidin-phycoerythrin, and analyzed using the Luminex100. Mean background-subtracted MFIs were calculated, and representative results from 12 individuals are shown. M, HbA; f, HbS; u, non-E; o, HbE. The dashed line indicates the MFI value below which samples were considered negative.

## Gene frequency studies 2004

Clin Genet 2004; 65: 338-342  
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Short Report

The frequency of GJB2 and GJB6 mutations in the New York State newborn population: feasibility of genetic screening for hearing defects

T Fitzgerald, S Duva, H Ostrer, K Pass, C Oddoux, R Ruben and M Caggana

NYS Department of Health, Wadsworth Center, Albany, NY  
University School of Medicine, NY  
Albert Einstein College of Medicine, Bronx, NY

## Folate related birth defects 2005

### Folate-Related Genes and Omphalocele

James L. Mills,<sup>1,2</sup> Charlotte M. Drusebel,<sup>2</sup> Faith Pangillina,<sup>2</sup> Kenneth Pass,<sup>4</sup> Christopher Cox,<sup>1</sup>  
 Rebecca R. Seltzer,<sup>3</sup> Mary R. Conley,<sup>3</sup> and Lawrence C. Brody<sup>5</sup>  
<sup>1</sup>Division of Epidemiology, Statistics and Prevention Research, NICHD, NIH, DHHS, Bethesda, Maryland  
<sup>2</sup>Congenital Malformations Registry, New York State Department of Health, Albany, New York  
<sup>3</sup>Genome Technology Branch, NHGRI, NIH, DHHS, Bethesda, Maryland  
<sup>4</sup>Wadsworth Center, New York State Department of Health, Albany, New York

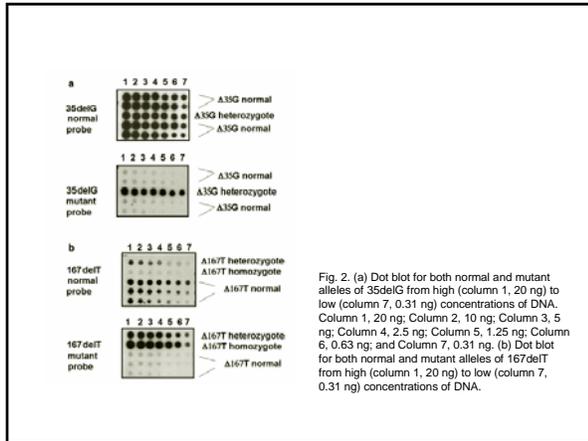


Fig. 2. (a) Dot blot for both normal and mutant alleles of 35delG from high (column 1, 20 ng) to low (column 7, 0.31 ng) concentrations of DNA. Column 1, 20 ng; Column 2, 10 ng; Column 3, 5 ng; Column 4, 2.5 ng; Column 5, 1.25 ng; Column 6, 0.63 ng; and Column 7, 0.31 ng. (b) Dot blot for both normal and mutant alleles of 167delT from high (column 1, 20 ng) to low (column 7, 0.31 ng) concentrations of DNA.

TABLE I. Polymorphism Rates in Omphalocele Cases and Control Subjects<sup>a</sup>N(%)

| <i>MTHFR</i><br>677C→T  | CC      | CT      | TT      |                      | OR <sup>b</sup> | 95% CI       |
|-------------------------|---------|---------|---------|----------------------|-----------------|--------------|
| Omphalocele             | 11 (44) | 13 (62) | 1 (4)   | T dominant $P=0.035$ | 3.60            | (1.07–11.47) |
| Control                 | 38 (64) | 16 (27) | 5 (8)   | T recessive $P=0.62$ | 0.67            | (0.06–5.38)  |
| <i>SLC19A1</i><br>12711 | AA      | AG      | GG      |                      |                 |              |
| Omphalocele             | 7 (28)  | 11 (44) | 7 (28)  | A dominant $P=0.87$  | 1.10            | (0.35–3.44)  |
| Control                 | 13 (22) | 29 (50) | 16 (28) | A recessive $P=0.45$ | 1.57            | (0.50–4.93)  |
| <i>TCN2</i><br>P259R    | CC      | GC      | GG      |                      |                 |              |
| Omphalocele             | 6 (25)  | 13 (54) | 5 (21)  | G dominant $P=*$     | *               | *            |
| Control                 | 9 (33)  | 28 (49) | 10 (18) | G recessive $P=0.60$ | 1.37            | (0.41–4.52)  |
| <i>MTHFD1</i><br>865A>  | AA      | GA      | GG      |                      |                 |              |
| Omphalocele             | 3 (12)  | 14 (56) | 8 (32)  | A dominant $P=0.74$  | 1.19            | (0.43–3.27)  |
| Control                 | 9 (16)  | 28 (48) | 21 (36) | A recessive $P=0.66$ | 0.74            | (0.19–2.94)  |

<sup>a</sup>Missing data *SLC19A1*=1, *TCN2*=3, *MTHFD1*=1.  
<sup>b</sup>Excludes three "other race" subjects.  
<sup>c</sup>Odds ratio not homogeneous by Breslow–Day.