

*→ Tables out of text*Interpretation of Statistical Tables from ER/PR DatabaseDRAFT: January 31, 2008

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1. Introduction

This note provides a summary interpretation of the statistical tables from the NLCHI ER/PR Database. The tables address clinical issues only. Communications data will be forthcoming.

Throughout this report, references are made to original data from Eastern Health. It is important to bear in mind, however, that the data represents patients from all regions of the province and that not all of the steps in ER/PR testing take place in the Eastern Health laboratory. For example, tissue extraction and fixation occur at many sites throughout the province before transport to the laboratory, and post-laboratory interpretation and reporting by pathologists occur at many sites as well. Eastern Health collected and reported data on the retesting process for all patients starting in 2005, and therefore the data against which the NLCHI database can be compared belongs to Eastern Health.

2. Total Cases

Eastern Health reported to the public on December 11, 2006 that there were 939 patients retested at Mount Sinai. This number was also reported to the Minister of Health and Community Services on November 23, 2006, to the court in affidavits, and to the media and public throughout the period in 2007 leading up to the appointment of the Commission.

The 939 total was explained by Eastern Health as containing all patients who had an ER/PR negative test result performed at Eastern Health between 1997 and August 2005 and subsequently sent to Mount Sinai for retesting. It was acknowledged as well that the total contained some original positives which doctors had specifically asked to be retested.

Using the same definitions, NLCHI found 1016 cases, or 77 greater than the number reported by Eastern Health. It is not possible to explain completely the difference between the old 939 total and the new 1016 total because, as part of the tracking and data management process within Eastern Health, the spreadsheet which originally contained the 939 count was overwritten with updates many times. Therefore, it cannot be known with certainty how many cases, or which cases, were present or absent from the older Eastern Health spreadsheets. However, the general explanations for the new, higher total are:

- Some cases were identified by Eastern Health or self-identified by patients after the initial reporting of 939 in November 2006;

- Some cases of deceased individuals were not forwarded for testing because of a perception in some RHAs that only living patients need be identified;
- The challenges faced by Eastern Health (e.g., multiple information systems from which to identify original ER/PR tests and original test scores; multiple channels for submitting retests to Mount Sinai; lack of an overarching information system to integrate records for all unique patients).

Within the 1016 cases, there are 19 original positives that were sent to Mount Sinai for retesting. While the original purpose of retesting was focused on negatives, some physicians asked for certain positive results to be retested. If these are removed for analytical purposes, there is a total group of original negatives of 997 that were sent to Mount Sinai.

3. Comparison of Eastern Health's November 23, 2006 Briefing for the Minister with New Database Results.

The briefing for the Minister on November 23, 2006 included a table with 11 categories of results, with total cases adding to 939. Eastern Health's briefing was primarily focused on the re-test outcomes for the 763 patients identified as living. All deceased patients were assigned to a 12th category entitled "deceased", whether or not re-test results on these cases had been received by that date. Eastern Health reported at that time that 176 people were deceased.¹

As the new database contains a larger "total cases" than the data reported by Eastern Health, it is not surprising that some of the components have also changed. For example, if Eastern had captured all of the cases that are in the new database, and had it been linked to the Provincial Mortality Database (through NLCHI), 295 people would have been identified as deceased at that time instead of 176.² This variance means that within not all of the 763 cases which were reported as living on November 23, 2006 could have been living at that time.³

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The key comparisons between the Eastern Health table (November 23, 2006) and the new database are as follows:

1. Eastern reported 341 living patients as "confirmed negative", whereas the new database shows [...] living patients confirmed negative;⁴

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¹ The Eastern Health data is contained in the first data column of Table 2 in Appendix 2.

² A year later, in late 2007, the number of deceased grew to (320) people.

³ This finding gives rise to the question of how Eastern Health could have reported this result if they had been in contact with all patients who were retested. This question will be explored further when the database results on communications are known.

⁴ The definition of "negative" between 1997 and 2000 uses a cut-off score of 30, and after 2000 it uses a cutoff score of 10. This approach is consistent with the letter (September 6, 2005) from Dr. Cook to lab directors and Medical Directors throughout the province in which instructions were given for the selection of samples for retesting at Mount Sinai. It is also consistent with Dr. Khalifa's proposed cutoff as communicated in his letter to pathologists on February 16, 2009.

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2. Eastern reported 213 living patients who had test results that converted from negative to positive but for various reasons had no change in treatment recommendation. The new database contains [...] living patients with this outcome.
3. Eastern reported that 104 living patients had a change in test results and required treatment change. The new database found [...] such cases.⁵

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Other than the identification of the number of deceased, it cannot be concluded that the Eastern Health table contained errors. The original Eastern Health data cannot be fully verified because the spreadsheets no longer exist to determine which cases were in each of the categories of the table on November 23, 2006. The absence of an auditable trail of records and spreadsheets is a shortcoming of the data management process.

4. Time frame for Retesting

The date that samples were sent to Mount Sinai can be determined for most of the cases. There are 57 cases where the date of testing cannot be determined from existing records. Out of the remaining cases, 85% were sent in 2005, 4% were sent in 2006 and 11% were sent in 2007.

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The reason why there was an increase in cases in 2007 was the identification of some deceased that had been originally omitted due to uncertainty over "inclusion criteria", the inclusion of cases between January and May 1997 over which it was initially unclear whether they were supposed to be retested, and the identification of additional cases that should have been sent in 2005.

Comment [t1]: Those deceased sent in July 2007 were not "omitted due to confusion" instead they were sent as a batch at a later date keeping with former CEO's promise to test all deceased. They were not sent earlier as from a patient care perspective, it was more important to test those alive.

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Number of Cases by Year of Original Test

The number of original negative ER/PR cases which were retested at Mount Sinai was highest between 1998 and 2002. The volume of tests curtailed substantially in 2004 and 2005.

| Year | Number of Tests | Percentage | Number of Cases | Percentage |
|------|-----------------|------------|-----------------|------------|
| 1997 | 63 | 5.6 | 61 | 6.1 |
| 1998 | 161 | 14.3 | 140 | 14.0 |
| 1999 | 168 | 14.9 | 150 | 15.0 |
| 2000 | 197 | 17.5 | 182 | 18.3 |
| 2001 | 157 | 14.0 | 141 | 14.1 |
| 2002 | 161 | 14.3 | 147 | 14.7 |
| 2003 | 116 | 10.3 | 98 | 9.8 |
| 2004 | 65 | 5.8 | 54 | 5.4 |

Comment [t2]: We believe that "number of cases" and "number of tests" are misplaced. There should be more tests than cases.

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⁵ [NLCHI to provide explanation for decreases in #s 2 and 3]

| | | | | |
|-------|------|-----|-----|-------|
| 2005 | 37 | 3.3 | 24 | 2.4 |
| Total | 1125 | 100 | 997 | 100.0 |

Source: NLCHI Patient Listing and Communication Events- ER/PR Retesting Report (2007)

5. Positivity Rates

The positivity rate is a readily accessible measure of whether a laboratory is producing results within expected ranges. In its initial internal assessment (July 2005) Eastern Health said that the normal range for positivity was 50-85%. Later, in a media briefing on December 11, 2006, Eastern said that the literature suggests that about 75% of breast cancers are estrogen-receptor –positive..... In June of 2007, Eastern reported its positivity rate as “65% from 1997-2005.....”. In an affidavit by Dr. Allen Gown, he stated that he had been advised that the seven year average was 74% ER-positivity. Upon review of the data given to him by Eastern Health it appeared that the ER positivity rate was in the range of 65-75% for breast cancers analyzed during the time the DAKO instrument was used.

It is important to make some methodological points about this Table B.

- First, the number of original negative tests (the numerator – column 1) was gathered by NLCHI using criteria for inclusion, plus measures to ensure the exclusion of any ER/PR cases performed for a reason other than breast cancer, any duplicate records and any data entry mistakes.
- Second, the total number of ER/PR tests performed by Eastern (the denominator – column 2) was provided by the Eastern Health. To the extent that there may be cases in the total count that should be excluded, this would make the positivity rate lower. If there were any reasons why cases were missed in the total count, a correction for this factor would make the positivity rate higher.
- Third, some of the retest samples were not the same paraffin blocks that were used to produce the original slides. The number of instances where this happened is not known, but believed to be a minority of the tests, and it is uncertain whether the effect would be to increase, decrease or cause no change in the positivity rate.
- Fourth, between 1997 and 2005 there were 49 negative cases (54 tests) which were subsequently identified as DCIS. These samples have been excluded from both the original tests and the Mount Sinai results because DCIS patients are not normally recommended for Tamoxifen in Canada and consequently are not normally sent for ER/PR testing. It remains uncertain whether there are additional DCIS cases within the approximately 2000 positive tests that should be removed if they could be identified.
- Fifth, there are a number of tests (37 in Table B) which could not be interpreted for inclusion. The exclusion of these tests, and the exclusion of DCIS noted above, from both the number of original negatives and the number of total tests, slightly increase the positivity rate.
- Finally, if it is assumed that all laboratories produce a small proportion of false positives, it can be assumed that a small proportion of the 397 tests (column 4)

which changed from negative to positive are actually true negatives. This factor, if a true value were known, would make the positivity rate lower.

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**Table B: Positivity Rate for ER/PR Testing
(Original and Adjusted), by Year**

| Year | [1] # of Original Negative Tests | [2] # of ER/PR Tests done by Eastern* | [3] Original Positivity Rate | [4] Changed Negative to Positive (Based on >30 (1997-2000) and >10 (2001- 2005)) | [5] Adjusted Positivity Rate |
|----------|--|--|---------------------------------------|---|---------------------------------------|
| 1997 | 56 | 130 | 56.9 | 17 | 70.0 |
| 1998 | 142 | 201 | 29.4 | 55 | 56.7 |
| 1999 | 158 | 351 | 55.0 | 67 | 74.1 |
| 2000 | 180 | 317 | 43.2 | 66 | 64.0 |
| 2001 | 136 | 327 | 58.4 | 70 | 79.8 |
| 2002 | 149 | 312 | 52.2 | 77 | 76.9 |
| 2003 | 97 | 306 | 68.3 | 35 | 79.7 |
| 2004 | 59 | 393 | 85.0 | 10 | 87.5 |
| 2005 | 23 | 204 | 88.7 | 0 | 88.7 |
| 97-05 | 1000 | 2541 | 60.6 | 397 | 76.3 |
| 97,99-05 | 858 | 2340 | 63.3 | 342 | 77.9 |
| 97,99-02 | 679 | 1437 | 52.7 | 297 | 73.4 |

*Data in this column was compiled by the Laboratory Division, Eastern Health. The 1998 number is being further evaluated for accuracy.

Source: Calculated from data provided in NLCHI Patient Listing and Communication Events- ER/PR Retesting Report (2007)

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A comparison of the positivity rates during this period with those from the literature is necessary to evaluate the data. One of the difficulties in doing a comparison is that most studies use a consistent 10% cutoff rate for assessing positivity. Eastern Health used this cutoff after 2001, but the cutoff was 30% before 2001. NLCHI produced tables to adjust for this factor. Table C below summarizes the original and adjusted positivity rates at the 30%/10% cutoff (30% before 2001 and 10% from 2001-2005), and at the 1%, 10% and 30% cutoff levels.⁶

⁶ The use of a 1% cutoff has been suggested by some practitioners and researchers as a clinically valid approach. Using this cutoff, if a sample shows greater than or equal to 1% presence of ER positive cells, the case would be regarded as positive and the patient may be recommended for Tamoxifen.

**Table C: Positivity Rate for Original ER/PR Testing,
by Cutoff Point, by Year**

| Year | 30/10 (Based on >30 (1997-2000) and >10 (2001- 2005)) | >1% | >10% | >30% |
|----------|---|------|------|------|
| 1997 | 56.9 | 64.4 | 56.9 | 56.9 |
| 1998 | 29.4 | 47.0 | 36.3 | 29.4 |
| 1999 | 55.0 | 70.7 | 60.3 | 55.0 |
| 2000 | 43.2 | 60.0 | 48.3 | 43.2 |
| 2001 | 58.4 | 67.7 | 58.4 | 58.4 |
| 2002 | 52.2 | 61.7 | 52.6 | 52.2 |
| 2003 | 68.3 | 77.3 | 68.3 | 68.3 |
| 2004 | 85.0 | 87.3 | 85.0 | 85.0 |
| 2005 | 88.7 | 90.3 | 88.7 | 88.7 |
| 97-05 | 60.6 | 70.6 | 62.6 | 60.6 |
| 97,99-05 | 63.3 | 72.6 | 64.9 | 63.3 |
| 97,99-02 | 52.7 | 65.1 | 55.2 | 52.7 |

Another issue with this approach to assessing the retest results is that the original purpose of the retesting process was patient care, not controlled research. Nonetheless, the retest group represents the complete set of negative ER/PR cases between 1997 and 2005 and therefore is unbiased for Newfoundland and Labrador. The characteristics of the Newfoundland and Labrador population could vary from the characteristics of study groups in the literature; but this issue has not been verified one way or another.

6. Changes in ER/PR Scores after Retesting

Eastern Health had a panel of physicians and quality officials examine most of the retests which had a changed result from Mount Sinai. This process allowed for an expert opinion to be rendered regarding each case, and a valid conclusion drawn on whether a change (i.e., from clinically negative to clinically positive and vice versa), had actually occurred. However, given that not all changed results were examined by the panel, another method was needed to calculate the total rate of changed results between Eastern Health tests and Mount Sinai tests.

Given that the results of the pathology reports are normally reported as a quantitative score between 1 and 100, it is possible to calculate the rate of change from negative to positive for the whole retest group, notwithstanding the determinations of the tumour panel. This approach uses straight mathematics, not clinical judgment, and is not to be regarded as a substitute for the work of the tumour panel. In particular, the change rate in the test results is not an indicator of the proportion of patients who should have received alternate treatment. It is important to bear in mind that only 34% of the changed results as reported by Eastern Health to the Minister on November 23, 2006 needed a change in

treatment. Although the NLCHI database includes different numbers than Eastern Health's report, the general principle would likely remain the same. Despite these cautions, the tables below are a useful way to examine technical aspects of the ER/PR test.

One of the challenges in calculating the extent of change in results is how to define negative and positive. Eastern Health states that prior to 2001 the definition of negative was less than or equal to 30 and positive was 30 or more. In 2001 the cutoff score was changed to less than or equal to 10, to take into account emerging evidence regarding the benefits of adjuvant therapy like Tamoxifen. Therefore, one way to analyze the data is to classify a "change" according to the cutoff in effect when the original test was done. For example, if a test done in 1998 was 5, and was found to be 25 when retested, it would not be classified as a change because it did not cross the cutoff point of 30. Alternatively, if the same test with a score of 5 was done in 2002, and the retest score was also 25, it would be classified as a change. This approach has the shortcoming that the actual utilization of these cutoff rates by pathologists and oncologists is not known and may have varied from physician to physician, but this issue cannot be quantified. The results are presented in Table D.

Table D: Change Rates* of Original Negative ER/PR Tests as Compared to Mount Sinai Results, by Year

(Based on >30 (1997-2000) and >10 (2001-2005))

| Year | Confirmed Negatives | Changed Negative to Positive | Change Rate as % of Negatives | Change Rate as % of Total Tests |
|----------|------------------------|------------------------------------|-------------------------------------|---------------------------------------|
| 1997 | 39 | 17 | 30.4 | 13.1 |
| 1998 | 87 | 55 | 38.7 | 27.4 |
| 1999 | 91 | 67 | 42.4 | 19.1 |
| 2000 | 114 | 66 | 36.7 | 18.6 |
| 2001 | 66 | 70 | 51.5 | 19.5 |
| 2002 | 72 | 77 | 51.7 | 22.9 |
| 2003 | 62 | 35 | 36.1 | 9.7 |
| 2004 | 49 | 10 | 16.9 | 2.5 |
| 2005 | 23 | 0 | 0.0 | 0.0 |
| 97-05 | 603 | 397 | 39.7 | 14.8 |
| 97,99-05 | 516 | 342 | 39.9 | 13.7 |
| 97,99-02 | 382 | 297 | 43.7 | 19.4 |

* Change Rate is defined as the proportion of total original negative ER samples that, upon retesting, had a positive score.

Another approach to classification would be to use the same cutoff for the whole period – i.e., either 1, 10 or 30%. Using a cutoff of 10, the example used above would be classified as a change. Using a cutoff of 30, the example above would not be a change. By using a standardized approach, the goal is not to reach a clinical conclusion, but rather

to reach a conclusion about the technical aspects of the test. Table E shows the percentage of changes for the four methods noted above (variable cutoff, 1%, 10% and 30%).

| Table E: Change Rates of Original Negative ER/PR Tests as Compared to Mount Sinai Results, by Year | | | | |
|--|---|------|------|------|
| Year | 30/10 (Based on >30 (1997-2000) and >10 (2001- 2005)) | >1% | >10% | >30% |
| 1997 | 30.4 | 27.7 | 37.5 | 30.4 |
| 1998 | 38.7 | 45.8 | 43.8 | 38.7 |
| 1999 | 42.4 | 60.2 | 56.5 | 42.0 |
| 2000 | 36.7 | 45.3 | 42.3 | 36.7 |
| 2001 | 51.5 | 50.5 | 51.5 | 39.9 |
| 2002 | 51.7 | 58.3 | 51.4 | 42.7 |
| 2003 | 36.1 | 37.1 | 36.1 | 22.2 |
| 2004 | 16.9 | 20.0 | 16.9 | 13.3 |
| 2005 | 0.0 | 10.0 | 0.0 | 0.0 |
| 97-05 | 39.7 | 45.7 | 43.8 | 35.1 |
| 97,99-05 | 39.9 | 45.7 | 43.8 | 34.5 |
| 97,99-02 | 43.7 | 50.9 | 49.0 | 39.4 |

7. Change Rate by Region

Using the variable cutoff method, the change rates for the province and the four regions are included in Table F.

| Table F: Change Rates (30/10 cutoff point) by Year and Region | | | | | |
|---|----------|---------|---------|---------|----------|
| Data to be Updated | | | | | |
| Time Period of Original Test | Province | Eastern | Central | Western | Lab/Gren |
| 1997 | 29.8 | 25.8 | 28.6 | 50.0 | 0.0 |
| 1998 | 44.3 | 39.4 | 56.7 | 43.8 | 33.3 |
| 1999 | 54.4 | 56.4 | 37.5 | 68.4 | 60.0 |
| 2000 | 42.1 | 34.7 | 46.9 | 50.0 | 83.3 |
| 2001 | 52.2 | 58.6 | 36.8 | 47.4 | 40.0 |
| 2002 | 54.2 | 57.8 | 45.5 | 50.0 | 50.0 |
| 2003 | 34.5 | 39.2 | 29.4 | 21.4 | 50.0 |
| 2004 | 18.0 | 8.0 | 42.9 | 12.5 | 0.0 |
| 2005 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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|---------|------|------|------|------|------|
| Total B | 43.5 | 43.4 | 42.5 | 43.9 | 48.5 |
|---------|------|------|------|------|------|

Source: NLCHI Patient Listing and Communication Events- ER/PR Retesting Report (2007)

On average for the whole period, the regions are not substantially different from the provincial average, except for Labrador/Grenfell at 48.5%, although it is not clear whether this is a concern due to low volumes from that region. There is no obvious pattern of results when each region is examined on a year by year basis.

[Insert new tables with uniform cutoff rates plus assessment of those tables.]

8. Changes by Site

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The new database shows that the average percentage of changes by site was 40 percent. In other words, 4 out of every 10 original negative results converted to positive. Most sites were close to or below this average. The two sites with the highest change rate were Clarenville (53%) and Labrador/Grenfell (49%). Given the small number of cases in both areas (15 and 37, respectively), it is not obvious whether there was any problem with such factors such as fixation or interpretation in these sites.

| Table G: Database Retest Results; Number of Changes (30/10 Cutoff Point) by Site (Total B) (To be updated) | | | |
|---|--------------------------|----------------------|------|
| Site | Number of Conversions | Total Unique Retests | % |
| HSC | 47 | 136 | 0.35 |
| St. Clare's | 117 | 290 | 0.40 |
| Grace | 27 | 74 | 0.36 |
| Carbonear | 27 | 68 | 0.40 |
| Clarenville | 8 | 15 | 0.53 |
| Grand Falls | 53 | 122 | 0.43 |
| Gander | 28 | 74 | 0.38 |
| Western | 69 | 174 | 0.40 |
| Lab/Grenfell | 18 | 37 | 0.49 |
| Total | 394 | 990 | 0.40 |

Source: NLCHI Patient Listing and Communication Events- ER/PR Retesting Report

Addendum

Variations between Reported Data and NLCHI Database

1. Positivity Rate

The May 10, 2007 document filed by Eastern Health with the Court contained data on total ER/PR tests conducted between 1997 and 2005, along with the total number of negatives in each year. Dr. Hutton, in a separate filing, used the data to calculate positivity and negativity rates. In December 2007 Eastern Health was asked by government to revisit the total number of tests in 1998 given that the number (147) appeared to be quite low when compared to the number of negative cases in the NLCHI database (139). In January 2008 Eastern Health provided a new number for 1998 (218), but the Department has again asked for a further review because the number still appears to be low compared to other years. The following table provides data on the above points:

| Year | May 10, 2007 data from Eastern Health | | May 16, 2007 data from Dr. Hutton | | January 2008 Revised Data from Eastern Health |
|--------------|---------------------------------------|-----------|-----------------------------------|------|---|
| | Total Tests | Negatives | Pos% | Neg% | Total Tests |
| 1997 | 137 | 57 | 58 | 42 | 137 |
| 1998 | 147 | 76 | 48 | 52 | 218 |
| 1999 | 360 | 126 | 68 | 32 | 360 |
| 2000 | 370 | 170 | 54 | 46 | 370 |
| 2001 | 374 | 173 | 60 | 40 | 374 |
| 2002 | 344 | 147 | 58 | 42 | 344 |
| 2003 | 373 | 89 | 76 | 24 | 373 |
| 2004 DAKO | 109 | 16 | 85 | 15 | 109 |
| 2004 Ventana | 381 | 41 | 90 | 10 | 381 |
| 2005 | 114 | 19 | 84 | 16 | 114 |
| Total | 2709 | 914 | | | 2780 |

Given the changed result for 1998, the data and calculations before the court will need to be amended.

2. False Negatives

In the May 10, 2007 affidavit, Eastern Health states that there were 330 changed patient results based on Mount Sinai testing. Thirteen of these changes were due to a change in the definition of positive, four had a change in diagnosis and 4 were retro-converters (positive to negative). Therefore, 309 changes was the net number of false negatives (306 from DAKO and 3 from Ventana). It is noteworthy that this number does not

include any deceased cases. The total number of changed cases in the NLCHI database is 377. In May 2007, Dr. Hutton estimated the total number of false negatives (DAKO results only) for living and deceased by inferring that the proportion of false negatives from the deceased results to date would be the same as among the deceased not then tested. His total was 366 false negatives.

Dr. Hutton then used this number of patients to calculate the number of false negatives as a proportion of total tests (2214 tests on DAKO, meaning that 16.6% were false negatives). The mixing of patient and test data is not a sound practice because some patients had more than one test sent to Mount Sinai for retesting.

Part of this problem is corrected in the August 3, 2007 document filed by Eastern Health with the Court which included the number of false negatives based on the Mount Sinai test results, not patient results (using the variable cutoff approach). The explanation of the methodology in the affidavit would indicate that it excluded incorrect diagnoses, cases affected by changed definitions, and cases which were originally positive. This approach means that it is consistent with the NLCHI approach. Eastern Health does not explain whether it has included test results for the 105 deceased patients who had been retested up to that point in time, but the similarity in total count with NLCHI indicates that they are included. The number of false negatives from Eastern Health's affidavit and from NLCHI's database are as follows:

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | Total |
|---------|------|------|------|------|------|------|------|------|------|-------|
| Eastern | 16 | 51 | 71 | 49 | 61 | 71 | 39 | 12 | 2 | 372 |
| NLCHI | 17 | 53 | 62 | 65 | 65 | 76 | 30 | 9 | 0 | 377 |

| Table 1: Database Contents | |
|---|------|
| Total Cases | 1210 |
| Total Patient Cases | 1045 |
| Less: Cases with original results before January 1997 | --- |
| Less: Cases with original results that were positive, and not known/included in Eastern Health spreadsheet August 1, 2006 (e.g., were retested after December 2006) | 15 |
| Less: Cases without original tests at Eastern Health. | 14 |
| Other??? | --- |
| Total A – Retested Cases consistent with December 2006 EH Report | 1016 |
| Less Original Positives up to December 2006*** | 19 |
| Total B – Retested Cases with Original Negatives | 997 |

Note: Total A includes:

- Any original positives that were identified in the August 1 Excel file
- Only those with original scores
- Cases with an original test done between January 1997 and August 2005

Total B includes

- Only those with original *negative* scores
- Cases with an original test done between January 1997 and August 2005

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Table 2: Comparison of EH Results and Database (Using Total A)

(Note: It is understood that NLCHI may not be able to determine if treatment changed for some of the converted cases. NLCHI will define appropriate categories to display this data.)

| Category | Sub-Category | Sub-sub-category | Nov 23 2006 | NLCHI Database | | |
|--|---|--|----------------|----------------|-----------------------|----------------|
| | | | | Alive | Deceased ¹ | Total |
| Results Obtained and Reviewed | No Change in Results and Subsequently No Change in Treatment | Confirmed Negative | 341 | 301 | 177 | 478 |
| | | Confirmed Negative from Panel | 28 | 5 (panel) | 1 (panel) | 6 (panel) |
| | | Confirmed Negative from Panel, letter unsigned | | 1 | 0 | 1 |
| | | Confirmed Positive | 12 | 5 | 3 | 8 |
| | | Confirmed Positive from Panel | n/a | 1 (panel) | 0 (panel) | 1 (panel) |
| | | DCIS | 52 | 40 | 6 | 46 |
| | | DCIS from Panel | n/a | 1 (panel) | 0 (panel) | 1 (panel) |
| | | Sub-total | 433 | 354 | 187 | 541 |
| | No change in results; requires change in treatment as definition of negative has changed | | 13 | No Data | No Data | No Data |
| | Change in results but does not require treatment change | No recommendation because they are low risk | 60 | 51 (panel) | 0 (panel) | 51 (panel) |
| | | No recommendation because they are previously treated with Tamoxifen or other aromatase inhibitor | 148 | 132 (panel) | 14 (panel) | 146 (panel) |
| | | New panel: No recommendation-previously treated | n/a | 3 (panel) | 0 (panel) | 3 (panel) |
| | | No treatment because they required assessment prior to recommendations | 5 | 4 (panel) | 0 (panel) | 4 (panel) |
| | | [No recommendation – other] | n/a | 11 (panel) | 2 (panel) | 13 (panel) |
| | | Sub-total | 213 | 201 | 16 | 217 |
| | Change in results and requires treatment change | Recommended for treatment with Tamoxifen or aromatase inhibitor | 96 | 94 (panel) | 0 (panel) | 94 (panel) |
| | | Recommended for treatment form panel, letter unsigned | n/a | 1 | 0 | 1 |
| | | New panel: Recommend treatment | n/a | 2 (panel) | 0 (panel) | 2 (panel) |
| | | Original diagnosis revised | 4 | N/D | N/D | N/D |
| | | Originally had a degree of ER positivity but on retesting was negative | 4 | 4 (panel) | 0 (panel) | 4 (panel) |
| | | Recommended to stop Tamoxifen | n/a | 0 (panel) | 1 (panel) | 1 (panel) |
| | | Sub-total | 104 | 101 | 1 | 102 |
| | Treatment changed-Not panelled | | n/a | 13 | 0 | 13 |
| | No treatment changed-Not panelled | | n/a | 16 | 0 | 16 |
| | Unknown treatment change-Not paneled | | n/a | 36 | 91 | 127 |
| Deceased | | | 176 | | | |
| Total Retested | | | 939 | 721 | 295 | 1016 |

¹ Deceased status as of November 23, 2006

² "No Recommendation-Other" includes information from panel letter that states the patient refused treatment, self-terminated, or could not tolerate treatment.

³ In the above analysis, if a patient was paneled, that recommendation took precedence over any other categorization, i.e. if a patient was confirmed negative or positive in the database, *and* paneled, they would be counted only in the appropriate panel category.

⁴ The difference in numbers presented November 23, 2006 (Eastern Health) and those provided by the Centre for Health Information cannot be resolved given the database used by Eastern Health in the 2006 news release no longer exists.

| Table 3: Deceased (Using Total A) | |
|--|-----|
| EH Reported as Deceased November 23, 2006 | 176 |
| EH Reported as Deceased August 1, 2007 | 195 |
| NLCHI Confirmed Deceased as of October 2005 | 239 |
| NLCHI Confirmed Deceased as of November 23, 2006 | 295 |
| NLCHI Confirmed Deceased August 1, 2007 | 316 |
| NLCHI Confirmed Deceased November 26, 2007 | 323 |

Note: The vital status of any individuals from St. Pierre, or have since moved from the province are not captured.

| Table 4: Number of Retests by Time Period and by Region (n=1110, Total B=997) | | | | | |
|---|--|-----------|-----------|---------|------------|
| Month Sent to MS | Number of Retests Sent to (or Reported from) Mount Sinai | | | | |
| | Eastern | Central | Western | L/G | Total |
| 2005 | 530 (477) | 208 (183) | 168 (143) | 4 (4) | 910 (807) |
| 2006 | 17 (14) | -- (--) | -- (--) | 22 (21) | 39 (35) |
| 2007 | 87 (86) | 4 (4) | 10 (10) | 3 (3) | 104 (103) |
| Not Available | 6 (6) | 9 (9) | 30 (25) | 12 (12) | 57 (52) |
| Total | 640 (583) | 221 (196) | 208 (178) | 41 (40) | 1110 (997) |

Note:

For n=1110, both those with no original testing and those with positive original scores identified by NLCHI were removed.

All other records kept; therefore analysis is based on records, not unique patients.

For Total B analysis is based on unique patients.

| Time Period of Original Test | Table 5: Number of Cases and Tests by Time Period of Original Test | |
|------------------------------|--|--|
| | Database (Total B) | Database (Total Original negative tests) |
| | # Cases sent for Retests* | # Tests sent for Retests* |
| 1997 | 61 | 63 |
| 1998 | 140 | 161 |
| 1999 | 150 | 168 |
| 2000 | 182 | 197 |
| 2001 | 141 | 157 |
| 2002 | 147 | 161 |
| 2003 | 98 | 116 |
| 2004 | 54 | 65 |
| 2005 (August) | 24 | 37 |
| Total | 997 | 1125 |

*Note: Excludes positives; negative defined as: ≤ 30 from 1997-2000, and ≤ 10 from 2001-2005.
Includes tests with unclear original scores (i.e. weak positive, equivocal, etc.)

*Please Note that the flowing is a preliminary analysis.

Table 5: Number of Unique Cases and Tests by Time Period of Original Test, excluding positives and those with no original ER testing in NL

| Time Period of Original Test | Table 5: Number of Cases and Tests by Time Period of Original Test | |
|------------------------------|--|--|
| | Database (Total B) | Database (Total Original negative tests) |
| | # Cases sent for Retests* | # Tests sent for Retests* |
| 1997 | 61 | 63 |
| 1998 | 140 | 159 |
| 1999 | 150 | 167 |
| 2000 | 182 | 195 |
| 2001 | 142 | 151 |
| 2002 | 147 | 157 |
| 2003 | 98 | 110 |
| 2004 | 54 | 61 |
| 2005 (August) | 24 | 28 |
| Total | 998 | 1091 |

*Note: Excludes positives; negative defined as: ≤ 30 from 1997-2000, and ≤ 10 from 2001-2005. Includes tests with unclear original scores (i.e. weak positive, equivocal, etc.)

Table 6: Database Retest Results by Time Period

| Table 6.1: Database Retest Results (from original negatives only) by Time Period, Criteria <1 (Total B) | | | | | | | |
|---|---------------------|------|--|------------------------------|--------------------|--------------------|-------|
| Time Period of Original Test | Province | | | | | | Total |
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on <1) | Some staining to No staining | Confirmed staining | Other ¹ | |
| 1997 | 34 | 3 | 12 | -- | 11 | 1 | 61 |
| 1998 | 49 | 10 | 46 | 8 | 26 | 1 | 140 |
| 1999 | 37 | 7 | 55 | 13 | 38 | -- | 150 |
| 2000 | 64 | 9 | 55 | 12 | 40 | 2 | 182 |
| 2001 | 52 | 8 | 50 | 7 | 24 | 1 | 142 |
| 2002 | 44 | 5 | 68 | 8 | 21 | 1 | 147 |
| 2003 | 44 | 6 | 23 | 7 | 15 | 3 | 98 |
| 2004 | 35 | -- | 9 | 6 | 4 | -- | 54 |
| 2005 | 17 | 1 | 2 | 2 | 1 | 1 | 24 |
| Total B | 376 | 49 | 320 | 63 | 180 | 10 | 998 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be 0 in this analysis.

| Table 6.2: Database Retest Results (from original negatives only) by Time Period, Criteria ≤ 10 (Total B) | | | | | | | |
|--|---------------------|------|--|------------------------------|--------------------|--------------------|-------|
| Time Period of Original Test | Province | | | | | | |
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on ≤ 10) | Some staining to No staining | Confirmed staining | Other ¹ | Total |
| 1997 | 35 | 3 | 20 | -- | -- | 3 | 61 |
| 1998 | 62 | 10 | 53 | 3 | 10 | 2 | 140 |
| 1999 | 53 | 7 | 70 | 4 | 12 | 4 | 150 |
| 2000 | 85 | 9 | 67 | 1 | 13 | 7 | 182 |
| 2001 | 64 | 8 | 65 | -- | -- | 5 | 142 |
| 2002 | 64 | 5 | 75 | -- | 1 | 2 | 147 |
| 2003 | 57 | 6 | 30 | -- | -- | 5 | 98 |
| 2004 | 44 | -- | 9 | -- | -- | 1 | 54 |
| 2005 | 21 | 1 | -- | -- | -- | 2 | 24 |
| Total B | 485 | 49 | 389 | 8 | 36 | 31 | 998 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be ≤ 10 in this analysis.

| Table 6.3: Database Retest Results (from original negatives only) by Time Period, Criteria ≤ 30 (Total B) | | | | | | | |
|--|---------------------|------|--|------------------------------|--------------------|--------------------|-------|
| Time Period of Original Test | Province | | | | | | |
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on ≤ 30) | Some staining to No staining | Confirmed staining | Other ¹ | Total |
| 1997 | 38 | 3 | 17 | -- | -- | 3 | 61 |
| 1998 | 75 | 10 | 53 | -- | -- | 2 | 140 |
| 1999 | 80 | 7 | 61 | -- | -- | 2 | 150 |
| 2000 | 103 | 9 | 65 | -- | -- | 5 | 182 |
| 2001 | 81 | 8 | 50 | -- | -- | 3 | 142 |
| 2002 | 78 | 5 | 63 | -- | -- | 1 | 147 |
| 2003 | 70 | 6 | 19 | -- | -- | 3 | 98 |
| 2004 | 47 | -- | 7 | -- | -- | -- | 54 |
| 2005 | 21 | 1 | -- | -- | -- | 2 | 24 |
| Total B | 593 | 49 | 335 | -- | -- | 21 | 998 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be ≤ 30 in this analysis.

Table 6.4: Database Retest Results (from original negatives only) by Time Period , Criteria ≤ 30 (1997-2000) and ≤ 10 (2001-2005) (Total B)

| Time Period of Original Test | Province | | | | | | |
|------------------------------|---------------------|------|---|------------------------------|--------------------|--------------------|-------|
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on ≤ 30 (1997-2000) and ≤ 10 (2001-2005)) | Some staining to No staining | Confirmed staining | Other ¹ | Total |
| 1997 | 38 | 3 | 17 | -- | -- | 3 | 61 |
| 1998 | 75 | 10 | 53 | -- | -- | 2 | 140 |
| 1999 | 80 | 7 | 62 | -- | -- | 1 | 150 |
| 2000 | 103 | 9 | 65 | -- | -- | 5 | 182 |
| 2001 | 64 | 8 | 65 | -- | -- | 5 | 142 |
| 2002 | 64 | 5 | 76 | -- | -- | 2 | 147 |
| 2003 | 57 | 6 | 30 | -- | -- | 5 | 98 |
| 2004 | 44 | -- | 9 | -- | -- | 1 | 54 |
| 2005 | 21 | 1 | -- | -- | -- | 2 | 24 |
| Total | 546 | 49 | 377 | -- | -- | 26 | 998 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be ≤ 30 (1997-2000) and ≤ 10 (2001-2005) in this analysis.

Table 6.5: Database Retest Results (from original negatives only) by Time Period, Criteria < 1 (Total Negative Tests)

| Time Period of Original Test | Province | | | | | | |
|------------------------------|---------------------|------|--|------------------------------|--------------------|--------------------|-------|
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on < 1) | Some staining to No staining | Confirmed staining | Other ¹ | Total |
| 1997 | 34 | 3 | 13 | -- | 11 | 2 | 63 |
| 1998 | 58 | 10 | 49 | 8 | 28 | 6 | 159 |
| 1999 | 41 | 8 | 62 | 14 | 42 | -- | 167 |
| 2000 | 70 | 10 | 58 | 13 | 42 | 2 | 195 |
| 2001 | 53 | 8 | 54 | 7 | 26 | 3 | 151 |
| 2002 | 50 | 5 | 70 | 8 | 22 | 2 | 157 |
| 2003 | 44 | 7 | 26 | 10 | 19 | 4 | 110 |
| 2004 | 40 | 1 | 10 | 6 | 4 | -- | 61 |
| 2005 | 18 | 2 | 2 | 3 | 1 | 2 | 28 |
| Total | 408 | 54 | 344 | 69 | 195 | 21 | 1091 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be 0.

Table 6.6: Database Retest Results (from original negatives only) by Time Period, , Criteria ≤ 10 (Total Negative Tests)

| Time Period of Original Test | Province | | | | | | Total |
|------------------------------|---------------------|------|--|------------------------------|--------------------|--------------------|-------|
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on ≤ 10) | Some staining to No staining | Confirmed staining | Other ¹ | |
| 1997 | 35 | 3 | 21 | -- | -- | 4 | 63 |
| 1998 | 72 | 10 | 56 | 3 | 11 | 7 | 159 |
| 1999 | 60 | 8 | 78 | 4 | 13 | 4 | 167 |
| 2000 | 94 | 10 | 69 | 2 | 13 | 7 | 195 |
| 2001 | 66 | 8 | 70 | -- | -- | 7 | 151 |
| 2002 | 72 | 5 | 76 | -- | 1 | 3 | 157 |
| 2003 | 62 | 7 | 35 | -- | -- | 6 | 110 |
| 2004 | 49 | 1 | 10 | -- | -- | 1 | 61 |
| 2005 | 23 | 2 | -- | -- | -- | 3 | 28 |
| Total | 533 | 54 | 415 | 9 | 38 | 42 | 1091 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be ≤ 10 .

Table 6.7: Database Retest Results (from original negatives only) by Time Period, Criteria ≤ 30 (Total Tests)

| Time Period of Original Test | Province | | | | | | Total |
|------------------------------|---------------------|------|--|------------------------------|--------------------|--------------------|-------|
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on ≤ 30) | Some staining to No staining | Confirmed staining | Other ¹ | |
| 1997 | 39 | 3 | 17 | -- | -- | 4 | 63 |
| 1998 | 87 | 10 | 55 | -- | -- | 7 | 159 |
| 1999 | 91 | 8 | 66 | -- | -- | 2 | 167 |
| 2000 | 114 | 10 | 66 | -- | -- | 5 | 195 |
| 2001 | 83 | 8 | 55 | -- | -- | 5 | 151 |
| 2002 | 86 | 5 | 64 | -- | -- | 2 | 157 |
| 2003 | 77 | 7 | 22 | -- | -- | 4 | 110 |
| 2004 | 52 | 1 | 8 | -- | -- | -- | 61 |
| 2005 | 23 | 2 | -- | -- | -- | 3 | 28 |
| Total | 652 | 54 | 353 | -- | -- | 32 | 1091 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be ≤ 30 in this analysis.

Table 6.8: Database Retest Results (from original negatives only) by Time Period, Criteria ≤ 30 (1997-2000) and ≤ 10 (2001-2005) (Total Tests)

| Time Period of Original Test | Province | | | | | | Total |
|------------------------------|---------------------|------|---|------------------------------|--------------------|--------------------|-------|
| | Confirmed Negatives | DCIS | Converted Negative to Positive (Based on ≤ 30 (1997-2000) and ≤ 10 (2001-2005)) | Some staining to No staining | Confirmed staining | Other ¹ | |
| 1997 | 39 | 3 | 17 | -- | -- | 4 | 63 |
| 1998 | 87 | 10 | 55 | -- | -- | 7 | 159 |
| 1999 | 91 | 8 | 67 | -- | -- | 1 | 167 |
| 2000 | 114 | 10 | 66 | -- | -- | 5 | 195 |
| 2001 | 66 | 8 | 70 | -- | -- | 7 | 151 |
| 2002 | 72 | 5 | 77 | -- | -- | 3 | 157 |
| 2003 | 62 | 7 | 35 | -- | -- | 6 | 110 |
| 2004 | 49 | 1 | 10 | -- | -- | 1 | 61 |
| 2005 | 23 | 2 | -- | -- | -- | 3 | 28 |
| Total | 603 | 54 | 397 | -- | -- | 37 | 1091 |

¹Other includes: unclear original results, those which MS reported as NT, EPAP, etc.

Note: Original ER scores reported as "neg" or "N" were considered to be ≤ 30 (1997-2000) and ≤ 10 (2001-2005) in this analysis.

The following table includes 1017 negative ER tests using criteria ≤ 10 .
Of 1017:

- 532 were reported as ≤ 10 by Mount Sinai.
- 102 had scores between >10 and ≤ 30 reported by Mount Sinai
- 79 had scores between >30 and ≤ 50 reported by Mount Sinai
- 235 had scores >50 as reported by Mount Sinai.

| Interval | No. Tests | % |
|--|-----------|-------|
| Confirmed Negative (≤ 10) | 532 | 52.3 |
| >10 and ≤ 30 | 102 | 10.0 |
| >30 and ≤ 50 | 79 | 7.8 |
| >50 | 235 | 23.1 |
| Others* | 69 | 6.8 |
| Total Original ER Negative (≤ 10) | 1017 | 100.0 |

* Others include those original negative scores (≤ 10) that were reported by Mount Sinai as DCIS, NT, EPAP, etc.