Data Article

Dataset of test volume and tests repeated for complete blood count and electrolyte panels from hospitals in a Canadian province in 2018

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A R T I C L E  I N F O

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A B S T R A C T

All laboratory tests performed within the province of Alberta in Canada are captured by three Laboratory Information Systems (LIS; Millennium, Sunquest and Meditech), which comprise the provincial Consolidated Laboratory Data Repository (CLDR). The following secondary laboratory data for electrolyte panel (EP) and complete blood count (CBC) test panels performed in emergency room (ER) and inpatient settings were collected from January 1 – December 31, 2018: total test panel volume, total number of test panels repeated, number of test panels repeated within the 24 hour period, test result, date of testing, time of test, and patient Provincial Health Number (PHN). Patient PHN were used as a linking variable to match subsequent tests performed on the same patient. The first time a test was recorded per patient was defined as the “index test”. If the same test panel was performed within a 24-h period following the index test for the patient, data for the repeated test panel was also collected. The index test was defined as “normal” or “abnormal” according to established laboratory normal values and laboratory test reference ranges. For CBCs, we considered the panel to be abnormal if any of the hematocrit (Hct), hemoglobin (Hgb), mean corpuscular hemoglobin concentration...
(MCHC), mean corpuscular volume (MCV), platelet (PLT), red blood cell (RBC), red cell distribution width (RDW) or white blood cell (WBC) values were outside the normal laboratory reference range. For electrolyte panels, we considered the panel to be abnormal if any of the chloride (Cl), potassium (K), and sodium (Na) were outside of the normal laboratory reference range. All EP results were from clinical chemistry analyzers only. The reuse potential of this dataset can allow other jurisdictions in Canada to compare their redundant repeat testing in their hospital settings with this dataset as a benchmark. This article was submitted via another Elsevier journal as a co-submission (“Inappropriate repeat testing of complete blood count (CBC) and electrolytes in inpatients from Alberta, Canada” [1]), and readers should refer to the co-submission article for interpretation of the results.

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| Specifications Table |
|-----------------------|
| Subject               | Pathology and Medical Technology |
| Specific subject area | Laboratory Medicine             |
| Type of data          | Table                           |
| How data were acquired| Secondary laboratory data was collected from the Consolidated Laboratory Data Repository, which includes all three Laboratory Information Systems in Alberta - Millennium, Sunquest and Meditech. |
| Data format           | Raw                             |
|                       | Filtered                        |
|                       | Analyzed                        |
| Parameters for data collection | Test order mnemonic (complete blood count and its constituents, and electrolyte panel and its constituents), test encounter (emergency room, inpatient), test volume, number of tests repeated, number of test panels repeated within the 24 hour period, test result, date of testing, time of test, and patient Provincial Health Number (PHN) in the 2018 calendar year (January 1 – December 31). |
| Description of data collection | Laboratory data was retrieved and aggregated by an independent Alberta Health Services data analyst (MG). Patient PHN were used as a linking variable to match subsequent tests performed on the same patient, which was then permanently removed upon completion of data retrieval. The first time a test was recorded per patient was defined as the “index test”. If the same test panel was performed within a 24-h period following the index test for the patient, data for the repeated test panel was also collected. The index test was defined as “normal” or “abnormal” according to established laboratory normal values and laboratory test reference ranges. For CBCs, we considered the panel to be abnormal if any of the hematocrit (Hct), hemoglobin (Hgb), mean corpuscular hemoglobin concentration (MCHC), mean corpuscular volume (MCV), platelet (PLT), red blood cell (RBC), red cell distribution width (RDW), or white blood count (WBC) values were outside of the laboratory reference range. For electrolyte panels, we considered the panel to be abnormal if any of the chloride (Cl), potassium (K), or sodium (Na) were outside of the laboratory reference range. All EP results were from clinical chemistry analyzers only. |
| Data source location  | Institution: Alberta Precision Laboratories |
|                       | City/Town/Region: Alberta         |
|                       | Country: Canada                  |
| Data accessibility    | With the article                 |
| Related research article | Kandalam, V., Lau, C.K., Guo, M., Ma, I., and Naugler, C. Inappropriate repeat testing of complete blood count (CBC) and electrolytes in inpatients from Alberta, Canada. Clin. Biochem. (2019) In Press. |
1. Data description

Secondary laboratory data was collected from CLDR, which contains laboratory data from all three LIS for the province of Alberta in Canada (Millennium, Sunquest, Meditech). Test volume, number of tests repeated within the 2018 calendar year, number of tests that were repeated within a 24-h period that was previously normal or abnormal (as defined by the laboratory reference range) for CBC and electrolyte panels by test in all inpatient and emergency room encounters across Alberta, matched by patient PHN, are summarized in Table 1. Complete blood count panels were considered to be abnormal if at least one of the following had an abnormal test result: Hct, Hgb, MCHV, MCV, PLT, RBC, RDW, or WBC. Electrolyte panels were considered to be abnormal if at least one of the following had an abnormal test result: chloride, potassium, sodium. The number and percentage of tests repeated, and tests repeated that were previously abnormal or normal were reported in Table 1 for each of the Laboratory Information Systems in Alberta.

2. Experimental design, materials, and methods

Laboratory data was retrieved and aggregated by an independent Alberta Health Services data analyst with access to CLDR, which contained laboratory data performed in all settings across Alberta. All laboratory tests performed within the province were captured by Millennium, Sunquest and Meditech LIS. The following secondary laboratory data for electrolyte panel (EP) and complete blood count (CBC) test panels performed in emergency room (ER) and inpatient settings between January 1 to December 31 in 2018 were collected: total test panel volume, total number of test panels repeated, number of test panels repeated within the 24 hour period, test result, date of testing, time of test, and patient Provincial Health Number (PHN). For each patient who received a test panel of interest, the PHN was temporarily used as a grouping variable to match subsequent tests to the same patient. There was no retrieval or collection of patient name and other individually identifying information by the researchers. The unique PHN was permanently removed upon completion of data retrieval. The first time a test was recorded per patient was defined as the “index test”. If the same test panel was performed within a 24-h period following the index test for the patient, data for the repeated test panel was also collected. The index test was defined as “normal” or “abnormal” according to established laboratory normal values and laboratory test reference ranges. For CBCs, we considered a result to be abnormal if any of the Hct, Hgb, MCHV, MCV, PLT, RBC, RDW, or WBC values were outside of the laboratory reference range. For electrolyte panels, we considered a result to be abnormal if any of the sodium, potassium, or chloride were outside of the laboratory reference range. To calculate the percentage of the repeated previously normal or abnormal results, the numerator was defined as the number of tests repeated within a 24 hour period that were previously normal or abnormal, whereas the denominator was defined as the total number of tests repeated within the study period of one year. All EP results were from clinical chemistry analyzers only. This article was submitted via another Elsevier journal as a co-submission, and readers should refer to the co-submission article for interpretation of the results [1].
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**Conflict of Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**References**

[1] V. Kandalam, C.K. Lau, M. Guo, I. Ma, C. Naugler, Inappropriate repeat testing of complete blood count (CBC) and electrolytes in inpatients from Alberta, Canada, Clin. Biochem. (2019) (In Press).

### Table 1

Dataset of test volume and tests repeated for complete blood count (CBC) and electrolyte panel (EP) in inpatient and emergency room settings in Alberta, Canada, in the 2018 calendar year. All three Laboratory Information Systems (LIS) contains laboratory data for the entire province of Alberta. If at least one of the test for the CBC or electrolyte panels was outside the normal reference range, the test panel was considered to be abnormal.

| LIS Number | CBC | Test Volume: Test | Tests Repeated: n (%) | Repeated, a | Previously Abnormal: n (%) | Repeated, a | Previously Normal: n (%) |
|------------|-----|-------------------|-----------------------|-------------|---------------------------|-------------|--------------------------|
| **LIS number 1** | | | | | | | |
| CBC Hct | 639,921 | 450,211 (70.4) | 210,180 (44.7) | 87,422 (19.4) |
| CBC Hgb | 639,921 | 450,211 (70.4) | 215,828 (47.9) | 72,774 (16.2) |
| CBC MCHC | 639,931 | 450,218 (70.4) | 76,065 (16.9) | 212,544 (47.2) |
| CBC MCV | 639,931 | 450,218 (70.4) | 43,637 (9.7) | 244,972 (54.4) |
| CBC PLT | 639,931 | 450,218 (70.4) | 98,388 (21.9) | 190,221 (42.3) |
| CBC RBC | 639,921 | 450,211 (70.4) | 205,347 (45.6) | 83,255 (18.5) |
| CBC RDW | 639,931 | 450,218 (70.4) | 78,220 (17.4) | 210,389 (46.7) |
| CBC WBC | 639,931 | 450,218 (70.4) | 122,737 (27.3) | 165,872 (36.8) |
| **EP Cl** | 417,973 | 337,258 (80.7) | 57,919 (17.2) | 192,588 (51.7) |
| **EP K** | 417,973 | 337,258 (80.7) | 43,938 (13.0) | 206,569 (61.2) |
| **EP Na** | 417,973 | 337,258 (80.7) | 51,396 (15.2) | 199,111 (59.0) |
| **LIS number 2** | | | | | | | |
| CBC Hct | 752,411 | 550,056 (73.1) | 271,148 (49.3) | 91,305 (16.6) |
| CBC Hgb | 752,411 | 550,056 (73.1) | 276,180 (50.2) | 80,272 (15.7) |
| CBC MCHC | 752,411 | 550,056 (73.1) | 39,519 (7.2) | 322,934 (58.7) |
| CBC MCV | 752,411 | 550,056 (73.1) | 45,792 (8.3) | 316,661 (57.6) |
| CBC PLT | 752,409 | 550,054 (73.1) | 96,773 (17.6) | 265,680 (48.3) |
| CBC RBC | 752,411 | 550,056 (73.1) | 242,335 (44.1) | 210,389 (46.7) |
| CBC RDW | 752,411 | 550,056 (73.1) | 131,930 (24.0) | 230,523 (41.9) |
| CBC WBC | 752,411 | 550,056 (73.1) | 150,558 (27.4) | 211,895 (38.5) |
| **EP Cl** | 610,176 | 464,928 (76.2) | 68,600 (14.8) | 247,155 (53.2) |
| **EP K** | 610,176 | 464,928 (76.2) | 60,337 (13.0) | 255,418 (53.2) |
| **EP Na** | 610,176 | 464,928 (76.2) | 66,426 (14.3) | 249,329 (53.6) |
| **LIS number 3** | | | | | | | |
| CBC Hct | 627,346 | 367,148 (58.5) | 101,411 (27.6) | 48,495 (13.2) |
| CBC Hgb | 627,346 | 367,249 (58.5) | 103,252 (28.1) | 46,705 (12.7) |
| CBC MCHC | 627,282 | 367,074 (58.5) | 25,988 (7.1) | 123,881 (33.7) |
| CBC MCV | 627,330 | 367,134 (58.5) | 29,161 (7.9) | 120,733 (32.9) |
| CBC PLT | 627,123 | 367,020 (58.5) | 36,357 (10.9) | 113,484 (30.9) |
| CBC RBC | 627,336 | 367,129 (58.5) | 96,535 (26.3) | 53,356 (14.5) |
| CBC RDW | 566,652 | 331,534 (58.5) | 53,829 (16.2) | 81,847 (24.7) |
| CBC WBC | 628,103 | 367,835 (58.6) | 66,294 (18.0) | 84,214 (22.9) |
| **EP Cl** | 427,830 | 267,408 (62.5) | 46,402 (17.4) | 84,921 (31.8) |
| **EP K** | 427,794 | 267,379 (62.5) | 36,546 (13.7) | 94,752 (35.4) |
| **EP Na** | 427,819 | 267,395 (62.5) | 29,074 (10.9) | 102,241 (38.2) |

**Abbreviations:** CBC – complete blood count; Cl – chloride; EP – electrolyte panel; Hct - hematocrit; Hgb - hemoglobin; K - potassium; LIS – Laboratory Information System; MCHC – mean corpuscular hemoglobin concentration; MCV – mean corpuscular volume; Na – sodium; PLT – Platelet; RDW – red cell distribution width; RBC – red blood cell; WBC – white blood cell.

* Tests repeated within a 24 hour period that had a previously normal, or abnormal test result, where abnormal was defined as outside the normal laboratory reference range for that test.

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