

# Evaluation of the use of laboratory tests in primary care

## *Avaliação da utilização dos recursos laboratoriais na atenção primária à saúde*

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### ABSTRACT

**Introduction:** The evaluation of the use of laboratory tests in primary care can improve the quality of care provided to the population. **Objective:** To evaluate the laboratory tests in primary health care. **Methods:** Tutorial groups were set to evaluate the reports of laboratory tests requested at 15 basic health units in the city of Botucatu during a 12-month period. The obtained information was evaluated as to the amount of tests requested per medical consultation and the proportions of tests with abnormal results. **Results:** The rate of laboratory tests requested in medical consultations is far above the recommended by the Ministry of Health, allowing us to infer that there are many unnecessary requests. The test that more often showed abnormal results was glycosylated hemoglobin, what indicates a possible inadequate management of diabetic patients. **Conclusion:** Knowing and monitoring laboratory attention enables health unit managers to enhance effectiveness and rational use of the scarce available resources.

**Key words:** laboratory test; primary health care.

### INTRODUCTION

Laboratory tests are effective tools to reduce the uncertainties of clinical practice, contribute to preservation and/or restoration of health, and improve the quality of health care<sup>(1)</sup>. Test ordering is influenced by organization of the health care system, physicians' and patients' characteristics, and the different interactions among these groups<sup>(2)</sup>. Nowadays, technology applied to health provides many test options for diagnostic investigation, being very popular among patients and physicians<sup>(3)</sup>. In certain clinical situations, additional diagnostic tests may be correctly ordered, including in the prevention and screening of several diseases<sup>(4)</sup>.

Although tests are known to be of great use, it is necessary to consider some risks besides those inherent in tests themselves, such as excessive collections causing unnecessary manipulations, for example. Some risks are posed by the tendency to over-order additional tests: anxiety generated by the expectation of a bad result; contempt for physical examination; work overload in laboratories and other services due to the large number of orders; delayed diagnosis, in situations in which clinical evidence should

suffice; misdiagnoses, considering that each ordered test presents varied proportions of false positives and false negatives; and lastly, the cost for both the patient and the system<sup>(5)</sup>.

The health care sector in Brazil lives at a very peculiar moment. The Unified Health System (SUS) is a modern model of organization of health services. However, despite its social reach, it has not been possible to implement it in the desired manner, due to difficulties related to both its financing and the administrative efficiency of its operation<sup>(6)</sup>.

In the evaluation of health services, one of the observed requirements is the rational use of diagnostic exams. According to technical recommendations by the Ministry of Health about SUS assistance parameters, the number of clinical pathology exams, by medical specialty, per 100 consultations, is 65 exams for internal medicine, 25 for gynecology, 200 for obstetrics, and 30 for pediatrics, with an average of 80 exams/100 consultations in basic clinics<sup>(7)</sup>.

The assessment of laboratory exam use in primary health may contribute to an optimization of available resources, aiming at improving quality of the service rendered to the population.

## OBJECTIVE

To evaluate the use of laboratory tests by primary health care units in the city of Botucatu, São Paulo, Brazil.

## METHODS

This prospective study was conducted at the technical sector of clinical analyses of University Hospital of Botucatu Medical School, Universidade Estadual Paulista (Unesp), an entity of the state health office, where exams from primary, secondary and tertiary attention of the city of Botucatu are analyzed. The study was designed for the Program of Education through Work for Health (PET-Saúde), ruled by the interministerial directive n° 421, of March 3, 2010.

This study was approved by the research ethics committee of Botucatu Medical School/Unesp, report 306,557 of June 14, 2013.

Tutorial groups were set for the evaluation of laboratory reports of tests ordered at 15 basic health units (UBSs) from January 2013 to February 2014. The groups were formed by medicine and nursing undergraduates, besides preceptors of these areas.

The groups received training in the correlation between clinical and laboratory findings, and weekly, the exams from the UBSs were analyzed according to sex, age and reference values. For information to flow rapidly, tests with abnormal results were discussed with the group, printed and referred with comments to the UBSs by students, preceptors, and the tutor involved in the study.

The information obtained from the reports was assessed regarding the amount of tests ordered per medical visit in primary attention. A survey of the number of medical consultations held in the period of study was undertaken at the municipal health office.

The rate of laboratory test ordering in medical consultations was calculated according to the following formula<sup>(6)</sup>:

$$\frac{\text{n}^\circ \text{ of clinical pathology exams in area A and period B}}{\text{n}^\circ \text{ of medical visits in the same area and period}} \times 100$$

The proportions of exams with abnormal results and those that most frequently presented abnormal results were verified. The average of exams ordered per consultation was calculated. All pieces of information were verified for the group and by UBS. These

results were disclosed to the UBSs as an instrument for service evaluation, allowing the development of indicators by means of a historical series in the unit itself to enlarge the analysis.

## Statistical analysis

The data obtained by report assessment were described as quantitative variables (discrete or continuous) and typed in an Excel spreadsheet. Later on, quantitative data were analyzed in a descriptive way, being presented in percentiles in case of non-normal distribution, or average  $\pm$  standard deviation (SD) in case of normal distribution. The softwares used for data analysis were SPSS for Windows, v. 17.0 (Chicago, USA), and the SAS for Windows, v. 9.1.3 (Cary, North Carolina, USA).

## RESULTS

Results reported from 22,138 ordered tests were analyzed for 3,449 patients seen in the UBSs during the study. The average of tests per order was 6.4. The total of medical consultations during the 706-day study period was 20,835. The rate of laboratory test ordering in medical consultations was 106 per 100 patients (106%).

Among the patients that underwent laboratory tests (3,449), 53% (1,827) presented some test with an abnormal result. Among the 22,138 analyzed laboratory tests, just 5,416 (24.4%) presented an abnormal result. The most frequently ordered laboratory tests are described in the **Figure**.

The laboratory tests most often presenting abnormal results are presented in the **Table**.

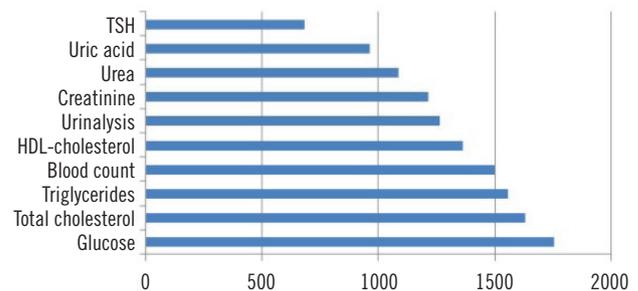


FIGURE – Tests most frequently ordered at UBSs

UBS: basic health units; TSH: thyroid-stimulating hormone; HDL-cholesterol: high density lipoprotein cholesterol.

TABLE – Proportion of altered exams in the group of UBSs

Test	<i>n</i>	% of abnormal tests
Glycated hemoglobin	559	41
Urea	409	38.4
Urinalysis	541	33.5
Triglycerides	1,768	23.4
Potassium	451	22.4
TSH	845	20.7
Parasitological stool examination	404	20

UBS: basic health unit; TSH: thyroid-stimulating hormone.

## DISCUSSION

The average of 6.4 tests per order can be considered excessive when compared with other studies of the public (4.9) and private (3.7) sectors<sup>(3)</sup>. We must highlight that the Ministry of Health neither makes technical recommendations nor sets an upper limit for the number of tests per order<sup>(8)</sup>. The rate of laboratory test ordering in medical consultations in the group of UBSs (106 exams/100 patients) is above the technical recommendations for assistance parameters of the Ministry of Health (80 exams/100 patients), what permits to infer that there are many unnecessary orders or consultation underreporting<sup>(9)</sup>.

In order to adequately assess the rates of laboratory test ordering per requesting unit, we must value the unit insertion in the assistance model of the city, as well as the conditions of installed capacity and the population profile of those receiving

assistance. The percentage of normal exams is relevant (75%), indicating the irrational use of laboratory medicine in the public outpatient service, or the laboratory use in prevention and screening of several diseases.

The types of exams most frequently ordered were those recommended for diagnosis and/or follow-up of patients with diabetes mellitus and/or arterial hypertension, and those used for routine clinical evaluation, with level of evidence A or B<sup>(10)</sup>. The test most often presenting alteration was that of glycated hemoglobin, indicating a possible inadequate management of diabetic patients.

## CONCLUSION

Assessing the rational use of laboratory tests in primary attention makes it possible to develop specific indicators, allowing comparison between the encountered situation and the ideal situation. This variable depends on the morbidity profile of patients and the unit insertion in the assistance model, which can be portrayed by the complexity of cases it treats.

By getting to know and monitoring laboratory attention, health system managers can optimize resources that are effectively available, no matter how limited they seem to be. Finally, the conduction of other planned investigations is necessary to evaluate the several factors involved in the complex causal chain of laboratory test ordering.

## RESUMO

**Introdução:** A avaliação da utilização dos exames laboratoriais na atenção primária pode melhorar a qualidade do atendimento prestado à população. **Objetivo:** Avaliar a utilização de exames laboratoriais pelas unidades de atenção primária à saúde de Botucatu, São Paulo, Brasil. **Métodos:** Foram realizados grupos tutoriais para avaliação dos laudos de exames laboratoriais solicitados por 15 unidades básicas de saúde do município de Botucatu, no período de 12 meses. As informações obtidas foram avaliadas quanto a quantidade de exames solicitados por consulta médica e proporções de exames com resultado anormal. **Resultados:** A taxa de solicitação de exames laboratoriais nas consultas médicas encontra-se acima das recomendações do Ministério da Saúde, permitindo inferir que há muitas solicitações desnecessárias. O exame que se apresentou anormal com maior frequência foi hemoglobina glicada, indicando um possível controle inadequado dos pacientes diabéticos. **Conclusão:** Conhecer e monitorar a atenção laboratorial possibilita aos gestores de unidades de saúde maior efetividade e uso racional dos escassos recursos disponíveis.

**Unitermos:** investigação laboratorial; atenção primária à saúde.

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