UPGRADING ENDOCRINE TEST REQUISITION FORMS TO IMPROVE DIAGNOSTIC ACCURACY AND REDUCE PRE-ANALYTICAL ERRORS: A REVIEW

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ABSTRACT
Endocrine investigations heavily depend on accurate pre-analytical practices, and even minor faults in communication between clinicians and laboratories can lead to mystifying or ambiguous hormone results. In many healthcare settings, the standard requisition form is not sufficiently detailed so that they fail to identify important clinical information like specific symptoms, current medications, menstrual status, timing, or specific patient preparation requirements. Each of these factors are required for ensuring accurate and reliable interpretation of the hormonal tests. This review evaluates the limitations seen in commonly used requisition forms and suggests remedial measures that help to minimise faults and improve diagnostic accuracy. Strengthening and formalizing basic but this vital document has the capability to significantly enhance the overall quality of endocrine reporting and thereby ensuring improved patient care and more accurate clinical decision-making.[1,2]

KEYWORDS: -
Endocrine assays, Pre-analytical errors, Laboratory requisition form, Clinical laboratory, Hormone testing, Diagnostic accuracy

INTRODUCTION
Hormone assays differ from routine biochemical tests in the degree to which they fluctuate with physiological and external influences. Parameters such as cortisol, ACTH, TSH, LH, prolactin, and various reproductive hormones may vary with time of day, stress, cycle phase, posture, and fasting status. [3] These fluctuations make it essential for laboratories to receive adequate background information. Unfortunately, in real-world practice, requisition forms often fail to capture these details.

A considerable proportion of laboratory errors—much of it at the pre-analytical stage—arises from issues such as incomplete forms, unclear test instructions, or missing clinical context.[1,2] As

endocrine testing increasingly incorporates dynamic procedures like stimulation and suppression tests, the need for a more structured and comprehensive requisition form becomes even more important. Components recommended in a modern endocrine requisition form is shown in TABLE 1.

Why Endocrine Tests Need Detailed Requisition Forms

Biological Variability

Endocrine markers demonstrate significant physiological variations. Cortisol and ACTH follow circadian patterns, while hormones such as LH and GH are secreted in pulses. Estradiol and progesterone shift across the menstrual cycle. Without these details, laboratories may misinterpret values that are actually physiologically normal. [3] Key pre-analytical variables influencing endocrine assays are shown in TABLE 2.

Influence of Medications

Many commonly prescribed drugs—including steroids, thyroxine, biotin supplements, antiepileptic agents, oral contraceptives, and certain psychiatric medications—can distort hormone levels or interfere with immunoassay methods. [4] A clear record of medications being taken is therefore vital for the laboratory.

Relevance of Clinical History

Pregnancy, acute illness, recent surgery, weight changes, and suspected endocrine disorders all influence interpretation. When this information is missing, laboratories may be forced to rely on assumptions, often resulting in repeat sampling or unnecessary investigations.

Dependence on Precise Timing for Dynamic Tests

Dynamic tests, such as ACTH stimulation, dexamethasone suppression, and glucose tolerance testing, require samples at specific intervals. Incorrect or missing time annotations can make results unusable.[5] A dedicated section for time-points removes confusion for both clinicians and laboratory staff.

Common Shortcomings in Existing Requisition Forms

Many routinely used forms are general-purpose documents meant for all biochemical tests. As a result, they frequently lack:

- A place for menstrual or obstetric history
- Clear fields for medication details
- Fasting status or posture information
- Spaces for time of sample collection
- Structured templates for dynamic testing
- Prompts for known analytical interferences
- Integration with laboratory information systems (LIS)[6]

Such gaps often lead to misinterpretation, longer turnaround times, or unnecessary repetitions. Pathway from incomplete requisition to diagnostic error, as shown in FIGURE1.

Suggestions for Upgrading Endocrine Requisition Forms

Acta Biomed 2025; Vol. 96, N. 1: ISSN: 0392-4203 | eISSN: 2531-6745

1. Mandatory Patient Identifiers

Basic demographic information must be complete. Pregnancy status should be highlighted clearly because it significantly affects thyroid, gonadotropin, glucose, and prolactin levels.[7]

2. Comprehensive Clinical Information Area

A well-designed form should include provisional diagnosis, duration of symptoms, menstrual cycle day, and relevant comorbidities. This helps the lab place hormone values in the correct clinical context.

3. Structured Medication Checklist

A tick-box design ensures clinicians can quickly indicate drugs such as:

- Thyroxine
- All forms of steroids
- OCP or hormone therapy
- Biotin supplements
- Antiepileptics
- Vitamin D/calcium
- Antidiabetic drugs

  Providing this information can prevent misinterpretation of altered or falsely elevated hormone results.[4] Medications commonly interfering with endocrine assays is shown in TABLE 3.

4. Clear Sample Collection Details

Essential entries include:

- Time of sampling
- Fasting status
- Posture (relevant for renin–aldosterone ratio)
- Time of most recent medication dose
- Rest period prior to prolactin collection

  Incorrect timing remains one of the main causes of erroneous endocrine values.[5]

5. Dedicated Sections for Dynamic Endocrine Tests

Pre-printed templates with fixed spaces for 0, 30, 60, and other applicable time-points greatly simplify processes for ACTH stimulation, dexamethasone suppression, OGTT, GH tests, and water deprivation testing.

6. Area for Potential Interferences

Labs benefit when clinicians indicate:

- Recent contrast exposure
- Possible macroprolactin
- Heterophile antibody issues
- Blood transfusion history

  This information helps the laboratory troubleshoot unexpected results.[7]

7. Integration with LIS/HIS

Electronic forms can automatically flag missing information, generate reminders for time-stamping, and warn against known drug–test interactions. Such systems have been shown to reduce pre-analytical errors significantly. [8] Improved diagnostic workflow with an upgraded form as shown in FIGURE 2.

Benefits of an Improved Requisition Form

A well-designed endocrine requisition form results in:

- Fewer rejections and repeat samples
- Higher diagnostic confidence
- Better clinician–laboratory communication
- Faster turnaround times
- Enhanced compliance with accreditation standards[6]
- Overall improved patient outcomes

Even small upgrades can have a major impact on workflow and diagnostic safety.

Proposed template for an endocrine test requisition form is shown in FIGURE 3.

CONCLUSION

Endocrine assays rely heavily on accurate pre-analytical information. The requisition form, though often overlooked, plays a key role in ensuring laboratories receive the details necessary for proper interpretation. Introducing structured sections for clinical history, medication intake, sample timing, and dynamic test protocols can significantly reduce errors and support more accurate, consistent endocrine reporting. Investing effort in revising the requisition form is a simple yet highly effective step toward better diagnostic practice.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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Table 1. Components Recommended in a Modern Endocrine Requisition Form

Category	Details Required
Patient identifiers	Name, age, sex, pregnancy status, MRN
Clinical history	Symptoms, duration, diagnosis, comorbidities
Cycle/obstetric data	LMP, cycle day, trimester
Medication checklist	Thyroxine, steroids, OCP, biotin, etc.
Sample timing	Exact collection time, posture, fasting status
Dynamic test fields	Fixed slots for baseline and timed samples
Special interference alerts	Contrast exposure, transfusion history

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Table 2. Key Pre-Analytical Variables Influencing Endocrine Assays

Pre-analytical Factor	Affected Hormones / Tests	Clinical Impact
Circadian rhythm	Cortisol, ACTH, TSH	Misleading interpretation if sampling time not recorded
Fasting status	Insulin, C-peptide, GH, glucose	False hypo/hyperglycaemia or abnormal insulin levels
Menstrual cycle phase	Estradiol, progesterone, LH, FSH	Incorrect classification of ovarian dysfunction
Posture (supine/upright)	Aldosterone, renin	Incorrect ARR values; misdiagnosed PA
Stress/resting state	Prolactin, GH	Stress-induced false elevation

Pre-analytical Factor	Affected Hormones / Tests	Clinical Impact
Pregnancy	TSH, FT4, prolactin, β-hCG	Failure to apply pregnancy-specific reference ranges
Medications	Steroids, OCP, biotin, antiepileptics	Drug-induced false highs/lows or assay interference
Sample handling	ACTH, PTH	Hormone instability causing falsely low values

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TABLE 3. Medications Commonly Interfering With Endocrine Assays

Acta Biomed 2025; Vol. 96, N. 1: ISSN: 0392-4203 | eISSN: 2531-6745

Drug Category	Mechanism	Affected Tests
Biotin supplements	Immunoassay interference	TSH, FT4, cortisol, troponin
Glucocorticoids	HPA axis suppression	Cortisol, ACTH
OCP/HRT	Alters SHBG; increases binding	Estradiol, TSH, prolactin
Thyroxine	Exogenous hormone effect	FT4, TSH
Antiepileptics	Enzyme induction	Vitamin D, thyroid hormones
Antipsychotics	Raises prolactin	Prolactin
ACE inhibitors / ARBs	Alter renin-angiotensin	Renin, aldosterone

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FIGURE 1. Pathway from Incomplete Requisition to Diagnostic Error

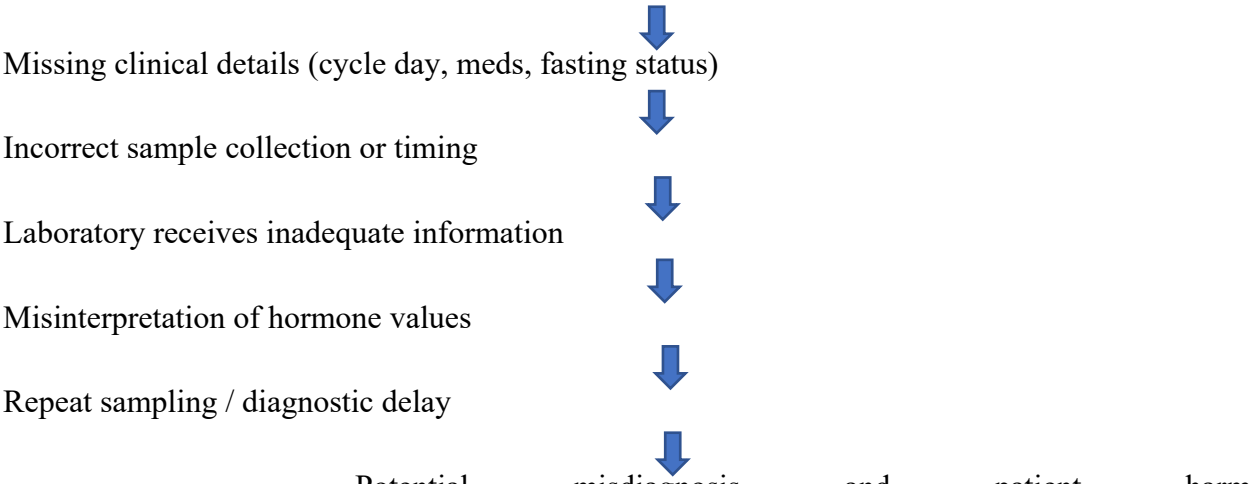

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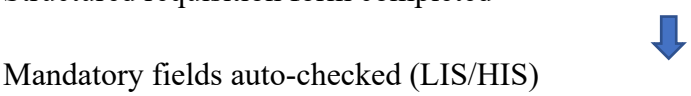
FIGURE 2. Improved Diagnostic Workflow with an Upgraded Form



Acta Biomed 2025; Vol. 96, N. 1: ISSN: 0392-4203 | eISSN: 2531-6745

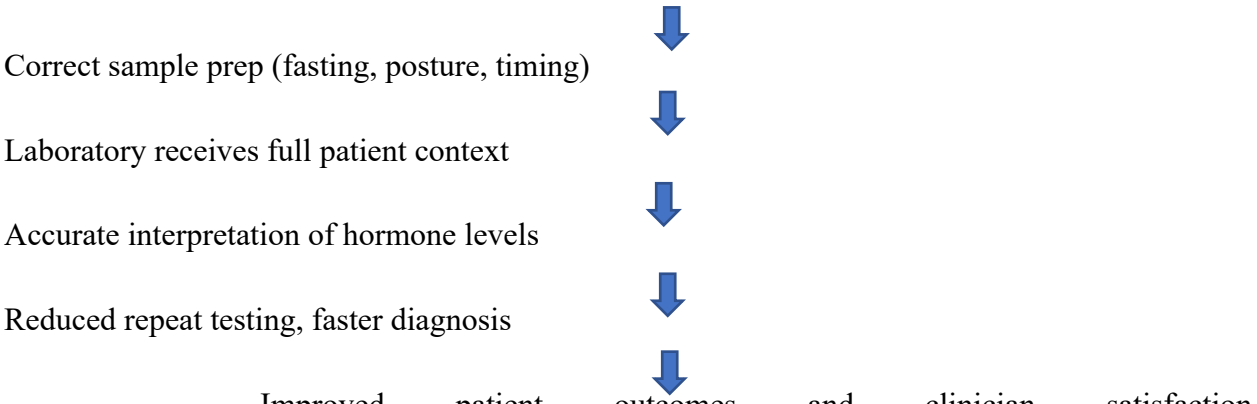


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FIGURE 3. Proposed Template for an Endocrine Test Requisition Form

Endocrine Test Requisition Form

1. PATIENT INFORMATION

Name: _____ Age: _____ Sex: _____

Hospital / MRD Number: _____

Contact Number: _____

Pregnancy Status: □ Yes □ No If Yes, Trimester: _____

2. CLINICAL DETAILS

Provisional Diagnosis: _____

Symptoms & Duration: _____

Comorbidities (CKD / Liver disease / Acute illness): _____

3. MENSTRUAL / OBSTETRIC HISTORY

LMP: _____

Cycle Day: _____

Obstetric Status (G/P): _____

Trimester (if pregnant): _____

4. MEDICATION CHECKLIST (Tick all that apply)

□ Thyroxine □ Steroids (oral / inhaled / topical)
□ OCP / HRT □ Antiepileptics
□ Biotin Supplements □ Psychiatric Medications
□ Vitamin D / Calcium □ Insulin / OHA
Other Medications: _____

5. SAMPLE COLLECTION DETAILS

Fasting Status: □ Fasting □ Non-fasting
Time of Sample Collection: _____
Posture: □ Supine □ Upright □ Unknown
Last Medication Dose Time: _____
Rest Before Prolactin Sampling: _____ minutes

6. DYNAMIC TEST SECTION (If applicable)

Test Name: _____

Time Point	Result / Notes
Baseline (0 min)	
30 minutes	
60 minutes	
90 minutes	
120 minutes	

7. SPECIAL INTERFERENCE / CRITICAL ALERTS

□ Recent Contrast Exposure
□ Recent Blood Transfusion
□ Suspected Macroprolactin
□ Possible Heterophile Antibodies
□ Biotin intake (last 48–72 hours)
Other Concerns: _____