The Enhanced Liver Fibrosis (ELF) Test

Assess the risk of nonalcoholic fatty liver disease (NAFLD) progression and liver-related events with a simple blood test

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NAFLD: A Worldwide Health Burden

What sets NAFLD apart from other common liver diseases is the volume of patients: an estimated 64 million in the U.S. and 52 million in European countries.[1]

Nonalcoholic fatty liver disease (NAFLD)
NAFLD is a condition in which excess fat that is not caused by heavy alcohol use is stored in the liver. Disease progression is strongly linked to liver fibrosis.

Known as the "silent killer," NAFLD is often asymptomatic and difficult to identify because of the way it can progress unnoticed until an urgent situation arises.

- NAFLD is found in up to 90% of obese patients and up to 80% of type 2 diabetes patients.[2]

- NAFLD is projected to become the leading cause of liver-related mortality within 20 years.[2]

- If left untreated, NAFLD may progress to nonalcoholic steatohepatitis (NASH).

Nonalcoholic steatohepatitis (NASH)
NASH is a severe form of NAFLD that includes inflammation and liver cell damage, which can then lead to the more-severe advanced fibrosis, cirrhosis, or liver-related events (LREs).

- NASH affects about 1.5 to 6.4% of people worldwide.[2]

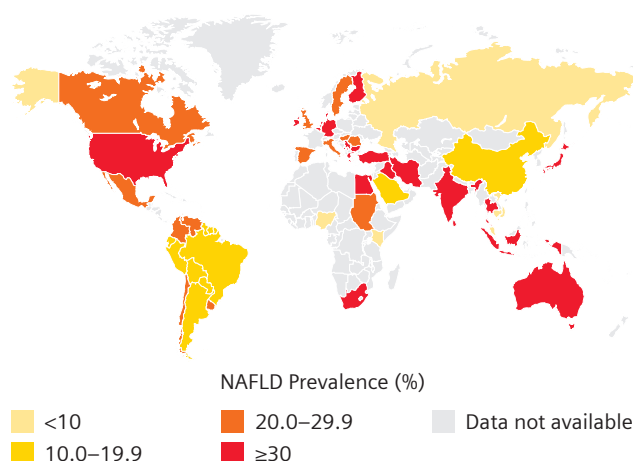- 1 in 5 patients with advanced fibrosis advance to cirrhosis in 2.5 years.[2]

NAFLD Prevalence (%)

<10	20.0–29.9
10.0–19.9	≥30
Data not available	

Figure 1. Worldwide Estimated Prevalence of NAFLD[1]

"If you just find fat in the liver by ultrasound or an imaging study, that by itself does not mean the patient is going to develop bad liver disease. What you must do is find those patients who have the highest chance of progression. So who are those patients? Those are the patients who have some scarring of the liver. How do we do this today? By liver biopsy. However, things are changing."

Dr. Zobair M. Younossi
Professor and Chairman of Medicine, Inova Fairfax Medical Campus, Virginia

The Rising Prevalence of NAFLD and NASH

25%
NAFLD affects 25% of people worldwide and is predicted to be the leading indication for liver transplantation within a decade.[2,3]

20%
20% of people with NAFLD are estimated to have NASH.[2,3]

$103 Billion
The estimated annual cost burden associated with NAFLD cases is $103 billion in the U.S.[1]
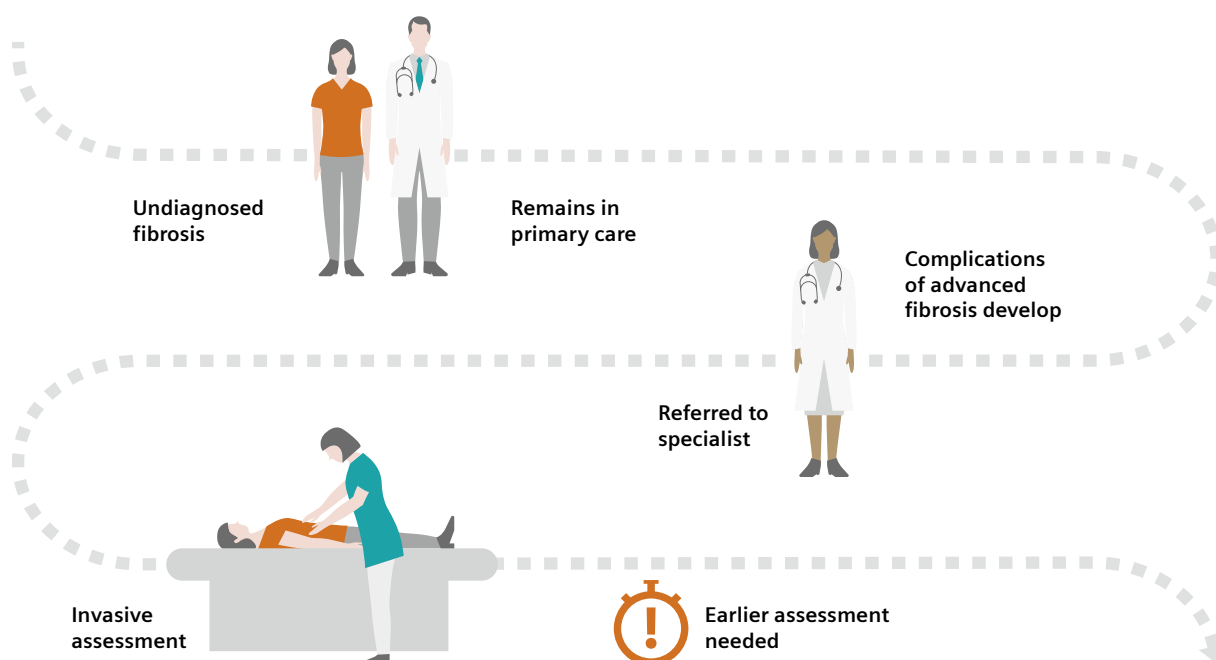
The Need for Noninvasive Tests

Current challenges in NAFLD patients
Among the current and growing number of NAFLD patients, there is an urgent need for the early and accurate identification of patients at risk of progressing to cirrhosis and liver-related events (LRE).

- Despite being the gold standard for diagnosing liver fibrosis, liver biopsy is a painful and invasive procedure associated with inter- and intra-observer variability and sampling error, which may make it impractical to use in every patient.[4-6]

- Patients with mild disease are often inappropriately referred to secondary care for invasive investigations.

- Undiagnosed patients remain in primary care until complications of cirrhosis develop.

As new therapies become available, noninvasive testing is an important tool to help identify patients at risk of developing cirrhosis and LREs.

Undiagnosed fibrosis

Remains in primary care

Complications of advanced fibrosis develop

Referred to specialist

Invasive assessment

Earlier assessment needed

Blood-based tests can readily support high-volume testing, do not require patient access to specialized imaging equipment or highly trained operators, and generally have lower incidence rates of failure and unreliable results reported for imaging modalities.

€35 Billion
The estimated annual cost burden associated with NAFLD cases is €35 billion in four European countries (Germany, France, Italy, and the UK).[1]

$1 Trillion
The expected 10-year burden of NAFLD could increase to an estimated $1.005 trillion in the U.S.[1]

€334 Billion
The expected 10-year burden of NAFLD could increase to an estimated €334 billion in four European countries (Germany, France, Italy, and the UK).[1]

The ELF Test

The Enhanced Liver Fibrosis (ELF™) Test is a noninvasive blood test that measures three direct markers of fibrosis. Direct assessment of fibrosis has proven valuable for identifying patients at risk of progressing to cirrhosis and/or LREs.

The most widely studied direct marker is the ELF Test which can assess active, dynamic fibrosis rather than the damage it has caused. This allows the ELF Test to be used as a prognostic marker to identify chronic liver disease patients most at risk of progression to cirrhosis and LREs.

- Access noninvasive testing with a simple blood test available to all healthcare practitioners and patients, including those with type 2 diabetes mellitus and obesity.[7,8]
- Improve patient care by identifying NAFLD patients and stratifying those at risk of progressing to cirrhosis and LREs.[9]
- Enhance prognostic patient management with a test that has been shown to be more accurate than biopsy at predicting progression to severe fibrosis and LREs.[9]

The ELF Test is the first routine, standardized, direct-biomarker panel for liver fibrosis assessment. The ELF score combines three serum biomarkers:

- Hyaluronic acid (HA)
- Procollagen III N-terminal peptide (PIIINP)
- Tissue inhibitors of metalloproteinase 1 (TIMP-1)

These individual biomarkers reflect integral extracellular matrix (ECM) components of fibrogenesis and fibrolysis processes.

In contrast, indirect-biomarker panels merely reflect a mixture of biochemical abnormalities found in chronic liver disease.

Each ELF Test biomarker assay is:

- Standardized to ensure reproducible analytical and clinical quality.
- Designed and validated for the sole purpose of liver fibrosis assessment

When the three direct biomarkers are combined in an algorithm, the resultant ELF score correlates to the level of liver fibrosis assessed by liver biopsy.[9]

Characteristics of an ideal noninvasive liver fibrosis test

	Validated Across Multiple Settings			Applicable in Different Patients/Conditions			Economic Health Value (Cost effectiveness)		Access	
	Primary Care	Secondary Care	Tertiary Care	Adults	Children	Obesity	Add Clinical Value	Decrease Unnecessary Referrals	Simple Blood Test	Large Installed Base
The ELF Test	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The ELF Test is available on multiple high-throughput analyzers, including the Atellica® IM Analyzer, the ADVIA Centaur® XP/XPT Immunoassay System, and the ADVIA Centaur CP Immunoassay System.

Assessing prognostic risk with a more accessible blood test can help improve outcomes

Multiple guidelines recommend the use of noninvasive tests

Chronic Liver Disease Foundation (CLDF)[16]
"To date, the ELF score demonstrates good correlations with progression of fibrosis in a number of chronic liver diseases."

European Association for the Study of the Liver (EASL)[17]
"Surrogate markers of fibrosis (NFS, FIB-4, ELF Test or FibroTest) should be calculated for every NAFLD patient, in order to rule out significant fibrosis (≥F2)."

British Society of Gastroenteritis (BSG)[18]
"Patients with intermediate risk should undergo second-line non-invasive testing either by additional tests like ELF test or FibroTest or by measuring liver stiffness. If advanced fibrosis is ruled out, patients can be treated as low risk and referred back to primary care."

The National Institute for Health and Care Excellence (NICE)[19]
"Consider using the Enhanced Liver Fibrosis (ELF) Test in people who have been diagnosed with NAFLD to test for advanced fibrosis."

American Association for the Study of Liver Diseases (AASLD)[20] prognostic
"NFS or FIB-4 index are clinically useful tools for identifying NAFLD patients with higher likelihood of having bridging fibrosis (stage 3) or cirrhosis (stage 4)."

American Diabetes Association (ADA)[21]
"Noninvasive tests, such as elastography or fibrosis biomarkers, may be used to assess risk of fibrosis, but referral to a liver specialist and liver biopsy may be required for definitive diagnosis."

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