The 'intelligent Liver Function Test' (iLFT):

A cost-effective way to improve quality of care

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Background

Mortality from most major disease areas is falling in the UK, but deaths from liver disease continue to rise *(Fig. 1)*. Liver disease is now the third most common cause of premature death (deaths under 65 years of age).[1]

Liver function tests (LFTs) are commonly used blood tests which may indicate liver disease. However, the results are often abnormal, the causes of which can be complex.[2] Many of these results are not acted on in accordance with national guidelines.[3]

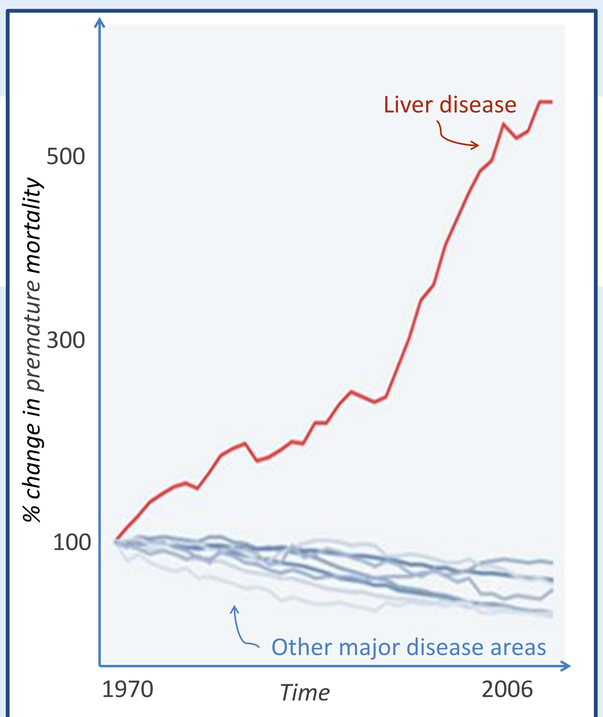

Fig. 1: Premature mortality from liver disease compared to other major disease areas, normalised to mortality rate from 1970. Adapted from Williams *et al.*, *Lancet,* 2014[1]

Key Points

- Liver disease is a major health problem in the UK
- Liver functions tests (LFTs) are commonly requested, commonly abnormal and may indicate serious underlying liver disease
- iLFT is an automated, algorithm-driven testing pathway which:
  - Increases diagnosis of liver disease by more than 40%
  - Saves over £3000 per patient lifetime
- iLFT is now fully operational across Primary Care in NHS Tayside

Aims of the 'intelligent Liver Function Test' (iLFT)

1. Increased investigation and diagnosis of liver disease
2. Earlier intervention in liver disease
3. Reduced morbidity, mortality and cost associated with late presentation

Methods

How does iLFT work?

iLFT is a novel, automated system that further investigates abnormal LFTs results on the **initial** sample from Primary Care. It combines patient demographics, clinical details and blood test results using advanced computer algorithms (*Fig. 2).*

The results are compared with liver disease criteria produced by expert hepatologists.[4] This allows a probable diagnosis and investigation/management plan to be generated.

The iLFT pilot study

The pilot study used a step-wedge design in which each GP practice acted as its own control for six months, followed by six months using iLFT. Health economics modelling was performed on the results.

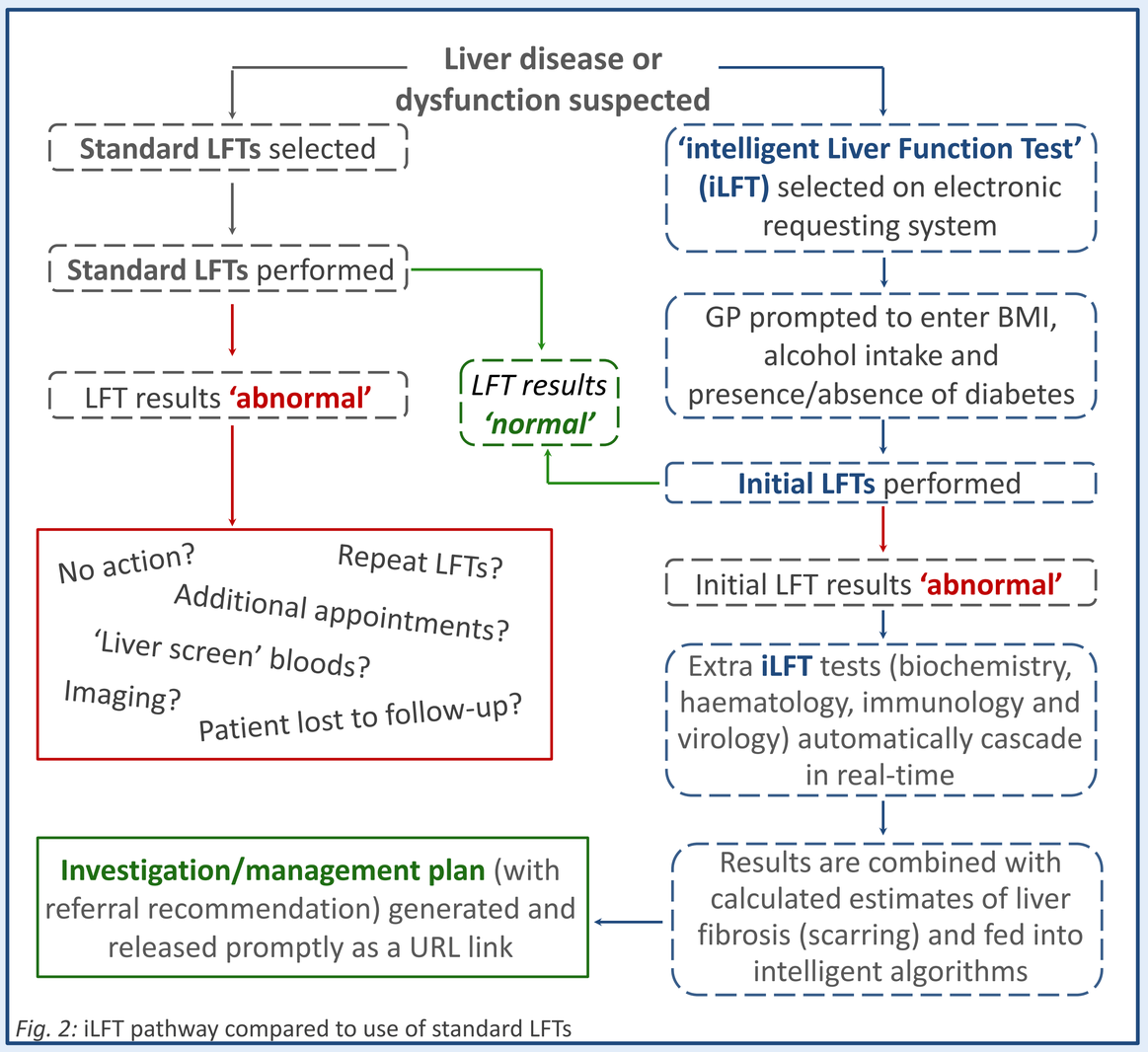

Fig. 2: iLFT pathway compared to use of standard LFTs

Results

Over 700 patients were enrolled in the pilot study; n= 490 in control group (standard care) and n=229 in iLFT group.

1 *Quality of Care*

+43% iLFT increased **diagnosis of liver disease** (*Fig.3)*

+40% iLFT increased **documentation of liver disease**

+59% iLFT increased **appropriate escalation of care**

2 *Health of Population*

iLFT modestly **improved length and quality of life** (*Fig.4)*

3 *Value & Sustainability*

iLFT is **highly cost-effective** (*Fig.5)*

iLFT was **approved by GPs** and gave increased value for the same or less work

iLFT has been **shortlisted for innovation awards**

Efficiency & productivity *Workforce* *Innovation*

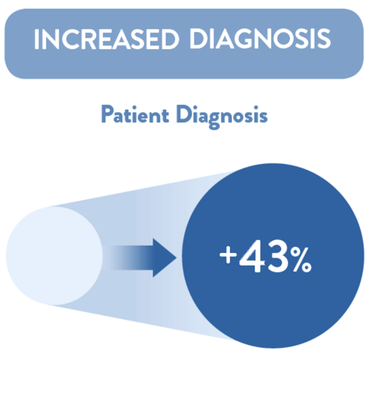

Fig. 3: Diagnosis of liver disease is increased using iLFT

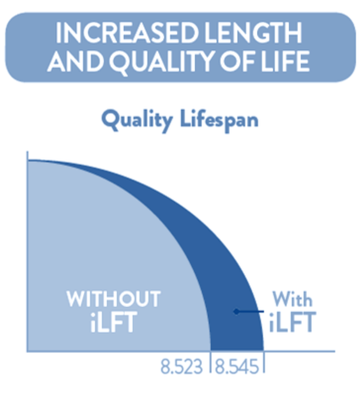

Fig. 4: 0.022 Quality-adjusted Life Years (QALY) are gained using iLFT

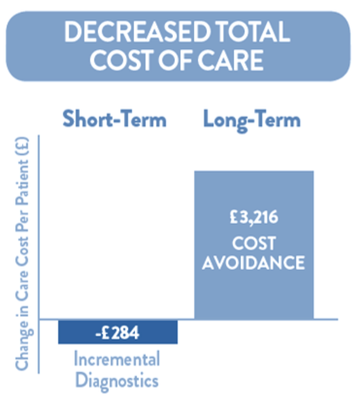

Fig. 5: iLFT has a low incremental cost-effectiveness ratio, and high potential savings

Conclusions

1. **iLFT improves diagnosis of liver disease and quality of care whilst remaining cost-effective**
2. Since mid-2018 iLFT has been **fully available across Primary Care** in NHS Tayside, with good uptake
3. iLFT **embodies the 2020 Vision for Health & Social Care**, offering an innovative, sustainable and efficient way to improve health across Scotland

What's next for iLFT?

- iLFT has been identified by the Scottish Government for roll-out across NHS Scotland
- Groups in NHS England & NHS Wales have also expressed interest in using iLFT
- Longer follow-up of patients to assess effect on morbidity and mortality and further research into use of new fibrosis (scarring) markers is already underway

References

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4. Miller M, Fraser A, Leggett G, *et al.* Development and validation of diagnostic criteria for liver disease from a minimum data set enabling the 'intelligent LFT ' pathway for the automated assessment of deranged liver enzymes. *Frontline Gastroenterol.* 2018; 9:175-182.