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ORIGINAL ARTICLE

Identify, screen and treat via electronic pathway: a semiautomated approach to retriaging a liver clinic waitlist

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Key words
outpatient clinic waiting list, reflex hepatitis C testing, triage, APRI, FIB-4.

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Abstract

Background: Long specialist outpatient waiting lists are a source of clinical risk. Triage assignment is based on subjective assessment of referrals and fails to account for dynamic changes in disease status while patients await clinical review.
Aims: To pilot an innovative triage method using a trifold approach to conduct noninvasive assessment of fibrosis and to determine the feasibility of reflex hepatitis C virus (HCV) polymerase chain reaction (PCR) testing.
Methods: A total of 1006 patients awaiting an initial liver clinic appointment at a tertiary Australian hospital were sent a short message service (SMS) requesting a blood test be completed. The first 60 patients received an SMS only, and the subsequent 946 patients also received a phone call from a Liver Care Guide (LCG), a nonclinician employed to increase patient engagement. Liver fibrosis assessment through noninvasive testing was performed using an aspartate aminotransferase to platelet ratio index (APRI) and fibrosis-4 (FIB4) score. Patients with an APRI ≥1, FIB4 ≥3.25 or positive HCV PCR were retriaged to Category 1.
Results: Four hundred ninety (49%) patients completed testing and 40 (4%) were triaged to Category 1. Subanalyses demonstrated increased response rates with LCG input ($P = 0.012$). Retriaged patients had been on the waitlist for a median of 216 days, exceeding initial category recommendations.
Conclusion: This study successfully implemented a semiautomated strategy that prioritises patients with probable advanced liver disease or active HCV, demonstrating enhanced patient engagement with LCG support. It highlights the burden of patients referred for specialist care and the need for innovative strategies for monitoring and objective risk stratification.

Introduction

In Australia, hospital-based outpatient clinics provide access to specialist care for the diagnosis and treatment of complex conditions. The referral from a primary care doctor or specialist is triaged before the patient is waitlisted for an initial appointment. Triage categories are based on urgency, determined through a subjective assessment of what is provided on the referral. In Victoria, Category 1 is urgent (<30 days), Category 2 is semiurgent (<90 days) and Category 3 is nonurgent (within 365 days). Subsequent to the completion of our study (in November 2022), the Victoria State-Wide referral revised criteria were implemented, with strict guidelines around the criteria required for referral to a specialist outpatient clinic.[1]

Australia's ageing population and high chronic disease burden are driving demand for outpatient services across all disciplines. Waiting times consistently exceed recommendations and are poorly responsive to deteriorating clinical status or increased clinical risk. South Australia is one of the few states in Australia to publicly disclose their specialist outpatient waiting list. Their census published in

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March 2022 demonstrated a median wait time of between 4 months (Royal Adelaide Hospital) and 21 months (The Queen Elizabeth Hospital) for Category 2 and Category 3 patients to see a gastroenterologist.[2]

There is clear evidence amongst surgical specialities and psychiatric populations that long outpatient wait times are associated with worse health outcomes and reduced expected health gains, compared with timely access.[3,4] The health outcomes relating to long wait times in disease entities that do not require operative intervention are difficult to quantify because of their breadth and complexity, and high-quality data remain sparse.

Chronic liver disease is an increasing healthcare challenge, associated with rising mortality, hospitalisation and economic burden.[5–7] Hospitalisation is driven by complications, including ascites, hepatic encephalopathy and hepatocellular carcinoma.[8,9] Early diagnosis and management of liver disease prevents disease progression and reduces complications, hospitalisation and mortality.[7] The leading causes of liver disease in Australia are metabolic-associated steatotic liver disease, alcohol use and viral hepatitis. Targeting and expediting patients with untreated hepatitis C virus (HCV) and those with underlying advanced fibrosis/cirrhosis for urgent care is therefore an unmet need.

Serologic scoring systems such as the aspartate aminotransferase (AST) to platelet ratio index (APRI) and fibrosis-4 (FIB-4) index have good negative predictive value for fibrosis.[10–12] These noninvasive scores can be used to assist in risk stratification for patients with possible underlying liver disease, making them an important tool in our objective risk and triage assessments. HCV diagnosis requires two separate, sequential pathology tests (antibody followed by qualitative testing) to confirm active infection. This results in high dropout rates (25–50%) and incomplete diagnostic workups.[13,14] Automatic, or 'reflex' HCV polymerase chain reaction (PCR) testing performed on any antibody-positive blood test reduces this care fragmentation and simplifies the care cascade.[15–17] Our aim was to expedite medical reviews for patients with active HCV or patients with a high probability of advanced liver fibrosis or cirrhosis.

Methods

Study population and setting

We assessed the feasibility and acceptability of a novel semiautomated electronic testing loop to effectively triage referrals. This testing loop had three components:

1 An opt-in pathology request sent through short message service (SMS), with ancillary support of a Liver Care Guide (LCG) to improve patient engagement and uptake of testing.
2 Automated calculation of specific fibrosis risk scores (APRI and FIB-4) from pathology results.
3 Reflex HCV PCR testing in those with positive antibodies to obviate the need for two phlebotomies.

This project was undertaken at Monash Health (MH), a tertiary referral centre in Victoria, Australia. The study was approved as a Quality Assurance Study, reference number RES-22-0000-140Q, by the MH Human Research and Ethics Committee.

MH is Victoria's largest health service, providing care to approximately 1.5 million people in southeast Melbourne. We utilised our existing hospital electronic waiting list as of 2 May 2022 to identify all adult patients awaiting an initial appointment at any MH Liver Clinic. We excluded patients without Medicare (because of cost for these patients as pathology was completed through an external provider) or mobile phone numbers.

Testing loop

Eligible patients received an SMS inviting them to participate in the retriage process by completing one blood test. The SMS advised them that they would be tested for diseases that could cause liver damage, and that participation was voluntary. If the patient agreed (through text reply, 'Yes'), a form was electronically sent to Dorevitch Pathology with the patient's information and standardised blood panel. This included full blood examination, urea electrolytes and creatinine, liver function test (LFT), international normalised ratio, HCV antibody and reflex HCV PCR testing in those with positive HCV antibodies. The 'Yes' reply also triggered an SMS with specific instructions on what to take to the pathology centre, a link to a webpage that provided comprehensive information on the process and a contact number for an LCG.

The SMS was followed up with a phone call from our LCG within 48 h (irrespective of SMS response). Pathology results were securely transmitted to an MH database every 24 h throughout the study, with autocalculation of APRI and FIB-4 scores. Retriage criteria were classified as an APRI of ≥1, FIB-4 ≥3.25 or positive HCV PCR. These cutoffs were chosen to maximise the likelihood of identifying patients with advanced fibrosis, acknowledging limitations in sensitivity and specificity in a heterogeneous population. Patients who met retriage criteria were automatically flagged and booked for a Category 1 appointment in a trial clinic set up for this purpose.

Patients who declined to participate were sent an automated SMS to acknowledge their response. Patients who did not reply at all were automatically sent a follow-up

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SMS at day 5. If no response was received or patients declined to participate, they remained in their place on the waiting list.

Liver care guide

The LCG was a nonclinician with cirrhosis who was employed by the hospital to improve attendance and uptake of the pathology testing; they contacted patients to reiterate the SMS information and answer any questions or concerns the patients may have regarding the pathology test. The LCG was supported by a doctor and was able to escalate concerns directly to this clinician.

The first 120 patients selected for enrolment in the study were randomised to receive a follow-up phone call (LCG positive) or no phone call (LCG negative) – this was not based on any criteria, and they were not matched groups. The 60 patients who were not contacted served as a control group for the response rate to SMS only, without the aid of an LCG to increase study participation. This aligned with our belief that an LCG would increase responses and uptake of the blood test, and as such all subsequent patients (886) received both an SMS and a phone call from the LCG.

Technology stack

Automation of data collection, APRI and FIB-4 calculation and SMS messages to patients was achieved using Microsoft's Power Platform tools, specifically Power Automate and Power Apps. SMS was sent through MessageMedia, a secure external provider.

The study was commenced in May 2022. Between 22 May and 6 July 2022, the SMS was sent out twice per week in batches of 80 to ensure that adequate support was available from the LCG. The last date for a blood test to be completed was 31 July 2022.

Statistical analysis

Descriptive analyses were computed with number of patients and percentages. Results were stratified by age, sex, language, days on waitlist, response category (did not respond, 'Yes' response, 'No' response), blood test category (bloods done or not) and were presented for the overall patient sample, for the 120 patients that were randomly selected for subgroup analyses (LCG positive and LCG negative groups), and patients referred for management of HCV. To assess normality of data, the D'Agostino–Pearson test was utilised, and statistical tests according to normality were chosen appropriately. To compare patient characteristics between cohorts in stratified data, t tests, one-way analysis of variance with Tukey multiple comparisons test and χ^2 tests were used according to the nature of the data and the number of cohorts compared. For LCG subgroup analyses and comparisons made between patients referred for HCV management and the rest of the study cohort, Fisher exact test was used instead of χ^2 tests, and relative risks (RRs) and 95% confidence intervals (CIs) were calculated using Koopman asymptomatic score. P values <0.05 were considered statistically significant. Statistical analyses were performed in GraphPad Prism version 9.0 for macOS.

Results

Fifteen patients were excluded from the initial list of 1021 patients because of no mobile phone number ($n = 9$) and no Medicare ($n = 6$). This left 1006 eligible patients.

Baseline demographics

The median age was 51 years (interquartile range (IQR): 40–61) and 527 (52%) were male. Patients spoke 37 languages, with 760 (76%) listing English as their primary language (Table 1).

The patients had been triaged by a gastroenterologist as follows: 37 (4%) in Category 1, 969 (96%) in Category 2 or 3. The overall median wait time was 283 days (IQR: 183–450 days).

Referrals to the MH Liver Clinic were predominantly from primary care doctors (630 (63%)) and internal MH specialists from other clinics (193 (19%)) (Table 1). Abnormal LFTs were the primary reason for referral in 213 (21%) patients, followed by hepatitis B virus in 209 (21%) patients, and abnormal LFTs with steatosis on imaging in 185 (18%) patients (Table 1). Sixty-five (6%) patients were referred for management of HCV.

Response rates (excluding subgroup analysis)

Six hundred ninety (73%) patients responded 'Yes' to the introductory SMS, indicating that they would undertake the pathology testing. Three hundred eighty-seven (56%) patients who did not provide a response to the initial SMS within 48 h required a prompting phone call from the LCG before they replied 'Yes'. The median age of these responders was 50 years, 351 (51%) were men and 524 (76%) listed English as their primary language (Table 1).

Fifty-one (5%) patients responded 'No' to the SMS, despite a phone call from the LCG. Two hundred sixty-five (27%) patients did not respond to the initial SMS despite receiving a phone call and repeat SMS. There were no statistically significant differences in sex, language and number of waitlist days between those who responded at all, or between those who responded, 'Yes' or 'No'.

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Table 1 Demographics

		Overall	'Yes' response	'No' response	Did not respond	Completed bloods	Retriaged Category 1
Total number (%)		1006	690 (68.38%)	51 (5.07%)	265 (26.34%)	490 (48.71%)	40 (8.16%)
Median age (IQR)		51 (40–61)	50 (40–60)	54 (45.5–65.5)	51 (38–61)	52 (41.25–62)	59 (46.5–69.25)
Male sex, *n* (%)		527 (52.29%)	351 (50.72%)	26 (50.98%)	150 (56.60%)	251 (51.22%)	24 (60.00%)
Primary language	English	760 (75.55%)	524 (75.94%)	42 (82.35%)	194 (73.21%)	361 (73.67%)	31 (77.5%)
Number (%)	Mandarin	29 (2.88%)	17 (2.46%)	2 (3.92%)	10 (3.77%)	15 (3.06%)	0
	Vietnamese	25 (2.49%)	16 (2.32%)	2 (3.92%)	7 (2.64%)	11 (2.25%)	1 (2.50%)
	Not stated	77 (7.65%)	56 (8.12%)	4 (7.84%)	17 (6.42%)	44 (8.98%)	3 (7.50%)
	Other (34 languages†)	115 (11.43%)	77 (11.16%)	1 (1.96%)	37 (13.96%)	59 (12.04%)	5 (12.50%)
Index triage category	1	37 (3.68%)	29 (4.20%)	3 (5.88%)	5 (1.88%)	21 (4.29%)	2 (5.00%)
Number (%)	2	950 (94.43%)	650 (94.20%)	47 (92.16%)	253 (95.47%)	462 (94.29%)	38 (95.00%)
	3	19 (1.89%)	11 (1.60%)	1 (1.96%)	7 (2.64%)	7 (1.43%)	0
Days on waiting list	Overall	283 (183–450.25)	309 (183–472)	283 (211.5–353)	283 (172–417)	309 (183–473)	216 (126.5–473)
Median (IQR)	Category 1	22 (22–46)	22 (21–60)	22 (22–22)	22 (22–46)	22 (22–22)	53 (52.5–53.5)
	Category 2	309 (207–468)	309 (207–473)	283 (242–353)	283 (202–424)	309 (207–473)	233 (134–473.75)
	Category 3	21 (21–23.5)	21 (21–38)	52 (52–52)	21 (21–23.5)	21 (21–38)	0
Referral source	GP	630 (62.62%)	454 (65.80%)	32 (54.34%)	144 (54.54%)	338 (68.98%)	28 (70.00%)
Number (%)	Internal specialist	193 (19.18%)	143 (20.72%)	5 (9.80%)	46 (17.36%)	105 (21.43%)	9 (22.50%)
	Gastroenterologist	44 (4.37%)	30 (4.35%)	1 (1.96%)	12 (4.53%)	19 (3.89%)	2 (3.75%)
	Inpatient team	111 (11.03%)	48 (6.96%)	12 (23.53%)	51 (19.25%)	21 (4.28%)	1 (2.5%)
	Emergency department	21 (2.09%)	12 (0.17%)	0	9 (3.40%)	6 (1.22%)	0
	Unknown	7 (0.70%)	3 (1.96%)	1 (1.96%)	3 (1.13%)	1 (0.20%)	0
Referral reason	Abnormal LFT	213 (21.17%)	159 (23.04%)	5 (9.80%)	49 (18.49%)	106 (21.63%)	9 (22.50%)
Number (%)	Steatosis	62 (6.16%)	49 (7.10%)	2 (3.92%)	11 (4.15%)	40 (8.16%)	2 (5.00%)
	Cirrhosis	114 (11.33%)	74 (10.72%)	6 (11.76%)	34 (12.83%)	51 (10.41%)	10 (25.00%)
	Abnormal LFT and steatosis	185 (18.39%)	126 (18.26%)	11 (21.57%)	48 (18.11%)	98 (20.00%)	8 (20.00%)
	HBV	209 (20.78%)	145 (21.01%)	11 (21.57%)	53 (20.00%)	100 (20.41%)	3 (7.50%)
	HCV	65 (6.46%)	29 (4.20%)	5 (9.80%)	31 (11.70%)	17 (3.47%)	5 (12.50%)
	Liver lesion	34 (3.37%)	23 (3.33%)	4 (0.78%)	7 (2.64%)	20 (4.08%)	1 (2.50%)
	Other	116 (11.53%)	82 (11.88%)	6 (11.76%)	28 (10.57%)	57 (11.63%)	2 (5.00%)
	No referral documentation available	8 (0.80%)	3 (0.44%)	1 (1.96%)	4 (1.51%)	1 (0.20%)	0

†Other Languages spoken: Arabic, Burmese, Burmese and related, Cantonese, Dari, Dinka, Fijian, Greek, Hakka, Hazaraghi, Hindi, Indonesian, Italian, Japanese, Karen, Khmer, Korean, Lao, Malayalam, Nuer, Oromo, Other Chinese, Pashto, Persian, Punjabi, Rohingya, Russian, Serbian, Somali, Spanish, Tamil, Thai, Tigre and Turkish.

GP, general practitioner; HBV, hepatitis B virus; HCV, hepatitis C virus; IQR, interquartile range; LFT, liver function test.

Older patients with a mean age of 56 years were significantly more likely to respond 'No' than 'Yes' ($P = 0.027$) and were significantly more likely to respond 'No' than not respond at all ($P = 0.022$) compared to younger patients with a mean age of 50 years (Fig. 1A).

Subanalysis – LCG

There were no statistically significant differences in baseline demographics of age or sex in those contacted by the LCG or not within the subgroup analysis.

All 60 patients who were contacted by the LCG responded, 51 (85%) patients responded 'Yes' and nine (15%) responded 'No'. Patients contacted by the LCG were 1.34 times more likely to respond ('Yes' or 'No') than not respond at all (RR: 1.34 (95% CI: 1.09–1.71), $P = 0.012$) compared to no contact from the LCG (Fig. 2). Although 42 (79%) of those who were contacted by the LCG had their bloods completed, 27 (45%) of those who were not contacted by the LCG had their bloods completed. There was no statistically significant difference in the likelihood of patients getting their bloods done if they were contacted by the LCG or not.

Outcomes

Four hundred ninety (49%) patients completed their blood test within the study time frame. There were no

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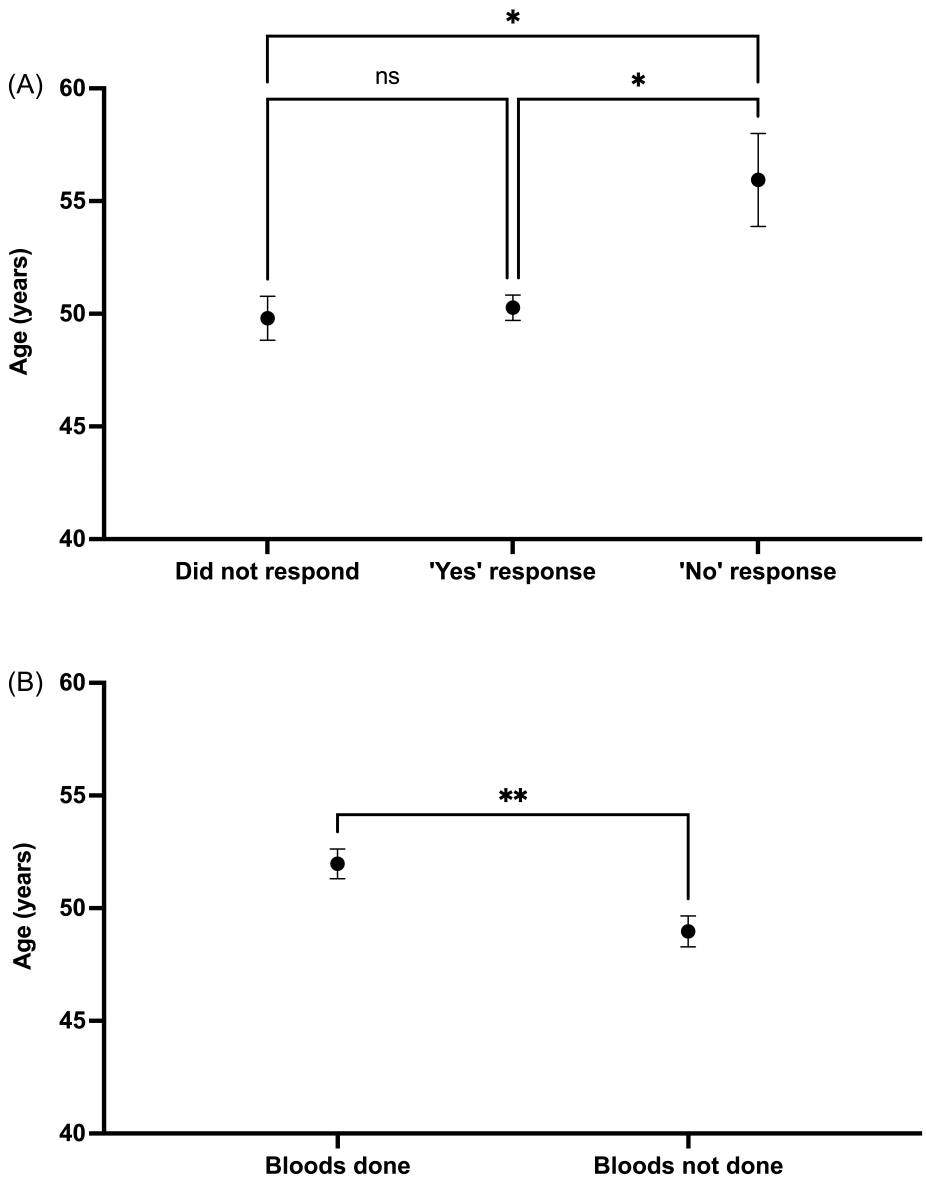

Figure 1 Older patients were more likely to respond and have bloods done compared to younger patients. (A) Response rates and (B) rates of completion of blood tests by age. Values are mean ± standard error of the mean. Statistical analysis by one-way analysis of variance with Tukey multiple comparisons test (A) and *t* test (B). *$P < 0.05$, **$P < 0.005$.

statistically significant differences in sex, language or days on the waiting list between those who had their bloods done and those who did not. Older patients were significantly more likely to get their bloods done than not, compared to younger patients ($P = 0.0017$, mean age: 52 years vs 49 years) (Fig. 1B). Forty (8% of those who completed bloods, 4% of contacted cohort) patients were triaged to Category 1 based on their APRI, FIB-4 or HCV results (Tables 2 and 3). Two of these retriaged patients were already Category 1 (median wait time- = 53 days) and 38 patients were Category 2 (median wait time = 233 days).

Fibroscan was performed on 26 patients, with a median stiffness of 15.4 kPa (IQR: 7.5–26.55). Of those who had a fibroscan, 15 had a median stiffness ≥13 kPa indicating moderate to severe scarring of the liver (Table 4).

Hepatitis C

Sixty-five (6%) patients were referred for management of HCV. Twelve were referred for positive HCV antibody, 51 for positive HCV PCR, one for a written diagnosis of HCV without any serology results and one with treated HCV for follow-up. These patients had a median wait time of 309 days (IQR: 216–473 days). Thirty-four (52%) patients responded to the text message, with 28 (44%) responding 'Yes'. Sixteen patients (25% of all HCV referrals) went on to get their

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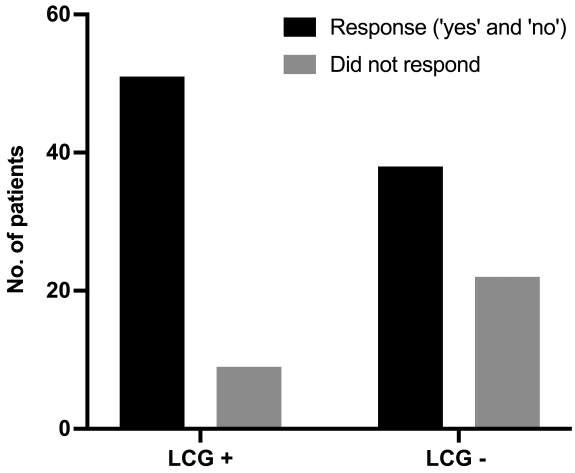

Figure 2 Patients contacted by the LCG were more likely to respond than not. Values are expressed as the number of patients who responded ('Yes' or 'No') and those who did not respond, by those contacted by the liver care guide (LCG (LCG+)) and not (LCG−). Statistical analysis by relative risks and 95% confidence intervals using Koopman asymptomatic score.

Table 2 Patients who were retriaged

Retriaged	($n = 40$)	Breakdown	
APRI ≥1	21	APRI ≥1 only	14
		APRI ≥1 + FIB-4 ≥3.25	14
		APRI ≥1 + HCV PCR +ve	1
		APRI ≥1 + HCV PCR +ve + FIB-4 ≥3.25	2
FIB-4 ≥ 3.25	23	FIB-4 ≥3.25 only	7
HCV PCR +ve	5	HCV PCR +ve only	2
Total			40

APRI, aspartate aminotransferase to platelet ratio index; FIB-4, fibrosis-4; HCV, hepatitis C virus; PCR, polymerase chain reaction.

Table 3 APRI and FIB-4 scores (all patients who had pathology completed)

	Score	Number of patients
FIB-4	<1.3	307
	1.3–3.25	160
	≥3.25	23
APRI	<0.5	378
	0.5–0.99	81
	≥1	31

APRI, aspartate aminotransferase to platelet ratio index; FIB-4, fibrosis-4.

Table 4 Fibroscan results

Retriaged to Category 1 and attended clinic ($n = 35$)		
Fibroscan performed	$n = 26$	
Median stiffness (MS)	15.4 kPa (IQR 7.5–26.55)	
Fibroscan breakdown	MS ≤7 kPa	$n = 6$ (23.08%)
	MS 7–13 kPa	$n = 5$ (19.23%)
	MS ≥13 kPa	$n = 15$ (57.69%)

IQR, interquartile range.

pathology taken. There was no significant difference in age, number of days on waitlist or sex in those who had their pathology taken.

When compared to the overall cohort, those who were referred for management of HCV were 1.92 times more likely to not respond than respond compared to the cohort referred for other reasons (RR: 1.92 (95% CI: 1.42–2.47), $P < 0.0001$). Similarly, patients referred for HCV management were 1.52 times more likely to not get their bloods done compared to the remaining cohort (RR: 1.52 (95% CI: 1.27–1.73), $P < 0.0001$).

Of the 490 patients who had their pathology taken, 37 (8%) were HCV antibody positive and had reflex PCR testing, with five patients PCR positive (all known PCR positive). The five HCV PCR-positive patients were retriaged to Category 1 and given outpatient appointments. Four of these patients attended clinic and three were commenced on direct-acting antiviral therapy. One patient failed to attend two consecutive appointments and was discharged back to their primary carer. One patient referred for HCV treatment had waited 503 days for an initial appointment. Their blood test performed as part of the triage strategy demonstrated an alanine transaminase level of over 1000 units/L. They were admitted directly to hospital and were found to have cirrhosis (not diagnosed at the time of the initial referral) and infiltrative hepatocellular carcinoma. They were transitioned to palliative care because of incurable disease and died within 6 weeks of hospitalisation.

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Discussion

This study successfully piloted a novel, semiautomated multipronged approach for the identification of patients with advanced liver disease, as well as active HCV. As with previously published data,[10–12] APRI and FIB-4 scoring proved useful in identifying patients with likely advanced liver disease, with transient elastography confirming advanced fibrosis (MS ≥13 kPa) in 58% of patients who underwent this confirmatory evaluation.

We demonstrated high levels of patient engagement and pathology completion using a semiautomated triage loop. Although there was no significant difference in pathology completion rates (LCG positive vs negative), we hypothesise that with a larger sample size, the LCG may improve pathology completion rates as well.

The prevalence of HCV in Southeastern Melbourne was estimated to be 0.67% (similar to the state average) in 2016.[18] Within the HCV cohort, existing literature suggests higher rates of socioeconomic disadvantage, drug use and mental health disorders,[19,20] all of which are linked with poorer health literacy and reduced engagement with health services.[21,22] There were significantly lower response and testing rates in our HCV cohort. This study successfully verified the feasibility of reflex HCV PCR testing on all positive antibody cases, an approach that has been well validated in the literature[17,19] and is now recommended to be performed in all patients undergoing HCV antibody testing in Australia.[23]

Reflex HCV PCR testing eliminates the need for dual pathology tests to confirm HCV diagnosis – a component of the diagnostic cascade that results in significant dropout and incomplete workup, substantially reducing the number of patients who can therefore access therapy for HCV.[13,14,19] Simplification and streamlining of the care cascade within our catchment represents a feasible approach to maintaining engagement and facilitating microelimination of HCV.[23] LCG involvement may represent a crucial step forward in engaging this cohort in healthcare, but further testing of this strategy is required.

Long wait times are a systemic issue in the public outpatient setting in Australia. The identify, screen and treat via electronic pathway study highlights unacceptable delays in access to care, with an overall median waiting time for Category 2 patients of 309 days: 219 days longer than the recommended government waiting time. In the current study, we highlighted how failing to see a patient within a timeframe can have a direct impact on morbidity and mortality, demonstrating why changing our waiting list strategies and developing novel approaches to triage and monitoring are so important. The responsibility for monitoring and management of patients while they await their initial consultation falls on the health service unless guidance is provided to referring doctors.

Digitisation of models of outpatient care with added human input to improve engagement can increase throughput, improve efficiency and identify increased clinical risk. The use of blood tests as an objective assessment to monitor patients and stratify risk is easily reproducible and could be utilised to review biochemical status on a regular basis for waitlisted patients, thereby reducing clinical risk through intermittent re-evaluation. Additionally, it is both scalable and translatable to other disciplines. Development of these new models of care should be trialled, funded and scaled.

Limitations of this study include the APRI and FIB-4 cutoffs that were chosen. These scores are noninvasive assessments of fibrosis; however, cutoffs are not well established and differ depending on underlying aetiology of liver disease. Establishment of a generalised cutoff is difficult and has definite limitations in terms of both sensitivity and specificity when applied to a heterogeneous population. With ongoing research into these scoring systems, we may be able to modify these values to increase the accuracy of predicting those at greatest risk of advanced fibrosis or cirrhosis. A further key limitation of this study was the small sample size used in the subgroup analysis.

Conclusion

Our study provides proof of concept that a semiautomated and multifaceted triage process implemented on a large scale (>1000 patients) is feasible and effective in risk stratifying patients for urgent care. This study demonstrated high levels of patient engagement with a semiautomated system, which was augmented by the utilisation of a care guide to answer questions and attain buy-in from consumers. The study has also demonstrated the ease of embedded scoring systems (APRI and FIB-4) and reflex HCV testing for those with a positive antibody result.

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