Integrated Care of Alcohol-Related Liver Disease

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Background/Aims: **Alcohol-related liver disease (ALD) is the medical manifestation of alcohol use disorder, a prevalent psychiatric condition. Acute and chronic manifestations of ALD have risen in recent years especially in young people and ALD is now a leading indication of liver transplantation (LT) worldwide. Such alarming trends raise urgent and unanswered questions about how medical and psychiatric care can be sustainably integrated to better manage ALD patients before and after LT.** ***Methods:*** **Critical evaluation of the interprofessional implications of broad and multifaceted ALD pathophysiology, general principles of and barriers to interprofessional teamwork and care integration, and measures that clinicians and institutions can implement for improved and integrated ALD care.** ***Results:*** **The breadth of ALD pathophysiology, and its numerous medical and psychiatric comorbidities, ensures that no single medical or psychiatric discipline is adequately trained and equipped to manage the disease alone.** ***Conclusions:*** **Early models of feasible ALD care integration have emerged in recent years but much more work is needed to develop and study them. The future of ALD care is an integrated approach led jointly by interprofessional medical and psychiatric clinicians. (J Clin Exp Hepatol 2022;12:1069–1082)**

Alcohol remains a primary etiology of liver disease worldwide[1] and a major source of global disease burden.[2] Alcohol-related liver disease (ALD) commonly presents in more advanced stages[3] and its morbidity and mortality are increasing including among young people.[4] At the core of ALD is alcohol use disorder (AUD), a prevalent, chronic, stigmatized, and deadly psychiatric condition which is often severe among ALD patients and comorbid with other psychiatric disorders of mood, anxiety, and personality.[5–8] This broad and serious medical-psychiatric pathophysiology ensures that no single discipline is adequately trained or equipped to manage ALD. This raises important questions about how different models of integrated care can be developed, implemented, and maintained.

Other authors recognize and call for multidisciplinary care to address such a breadth of serious and chronic ALD problems.[8–13] There is a newer and growing literature about the actual implementation and maintenance of integrated ALD care before and after liver transplantation (LT) as well as the pitfalls that can disrupt the work.[7,14,15] While integrated ALD care has obvious application in cirrhosis and LT where preventing further alcohol-related injury is paramount, it is also relevant and desirable in earlier and less severe disease stages where patients' course toward decompensation and transplant may be delayed or avoided altogether. Care integration is also indicated for at-risk groups, vulnerable populations, and ALD patients with disadvantaged LT access.

This article seeks not only to recapitulate key integrated care principles, preparations, processes, and pitfalls but also to depict in clear and practical fashion the discrete aspects of ALD that require an integrated approach thus equipping the reader with actionable insights and tools to begin their own ALD integration process.

PRINCIPLES OF CARE INTEGRATION

Blending the expertise of clinicians from different disciplines is an established idea. The integration of mental health services into general medical care, so-called collaborative care, is a model that has been well studied in its feasibility and effectiveness.[16,17] Collaborative care is governed by several key principles: team-driven, population-focused, measurement-guided, evidence-based, and accountability and quality improvement (Figure 1). These same principles apply to integrating psychiatric and addiction services into liver disease management. These ideas also appear in a 2016 joint report from the American Psychiatric Association and the Academy of Consultation-Liaison Psychiatry (formerly Academy of Psychosomatic Medicine) regarding the dissemination of integrated care within adult primary care settings.[18] This report cites studies examining the relative contributions of different roles on a collaborative team (Figure 2).

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Abbreviations: ALD: alcohol-related liver disease; AUD: alcohol use disorder; LT: liver transplantation; QI: quality improvement; SUD: substance use disorder
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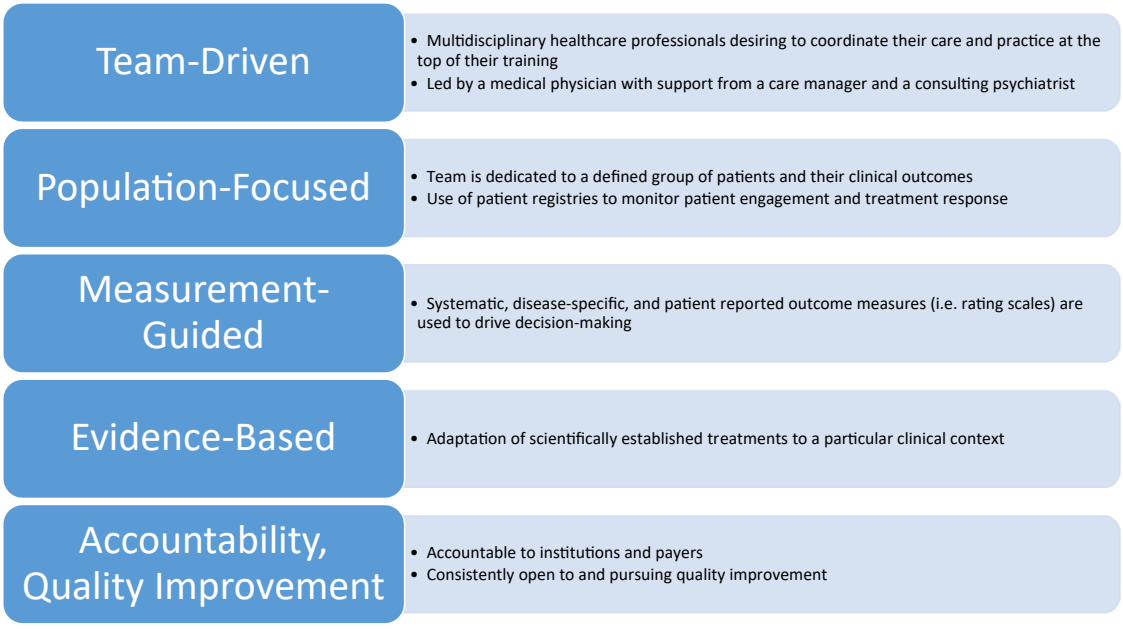

Figure 1 Essential elements of collaborative care (adapted from Vanderlip *et al*).[18]

INTERPROFESSIONAL IMPLICATIONS OF ALD PATHOPHYSIOLOGY

Articles have characterized medical and psychiatric facets of ALD pathophysiology;[2,9] it is clear ALD has far-reaching effects on patients and families and places unique demands on care teams and clinicians. Less has been written about the numerous interprofessional implications of ALD (Table 1) or the complicated logistics of integrated and interprofessional treatment models required to address such breadth and complexity.

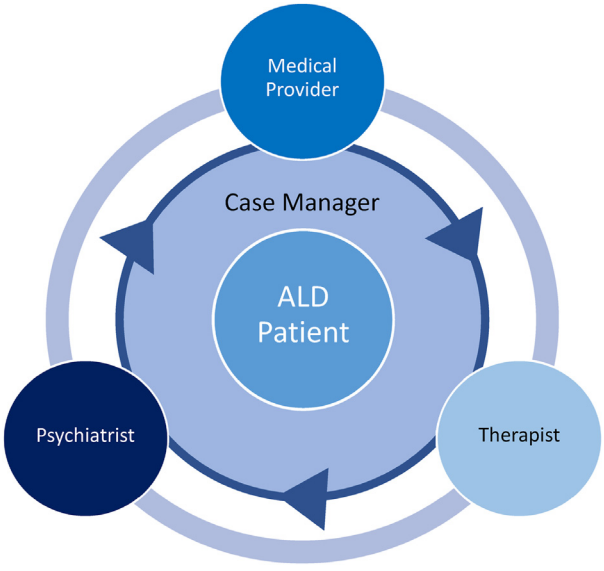

Figure 2 Collaborative care team model on which integrated ALD care models can be based.

Psychiatry and addiction clinicians are accustomed to dealing with a wide array of overlapping psychological disorders and symptoms just as hepatology and other medical clinicians regularly manage pathophysiology spanning multiple organ systems. ALD is unique and challenging in the way its clinical treatment requires a holistic view of its interprofessional medical-psychiatric complexity, as a unified core of ALD pathophysiology, rather than parsed or categorized components which can simply be delegated out to diverse specialists. Few would argue that an ideal liver transplant team is one where surgeons, hepatologists, and nurses rarely collaborated. Similarly, a growing number of clinicians in medicine and psychiatry are acknowledging how optimal ALD care models require integration.

PREPARATIONS FOR ALD CARE INTEGRATION

Personal Relationships, Personnel Recruitment, and Team Culture

The foundation of any interprofessional collaboration is a strong *a priori* set of personal and professional relationships shared among clinicians. The importance of constructive interprofessional team dynamics for complex and multifactorial diseases like ALD can be likened to the crucial natures of hand hygiene and surgical sterility for quality bedside care and procedures. Trust, patience, rapport, and good faith catalyze the complicated work of building and maintaining complex and chronic care models for a challenging ALD patient population. Such quality relationships must be an early objective for integrated care and they will not form automatically or easily; they must be deliberately

Table 1 Interprofessional Implications of ALD Pathophysiology Necessitating Integrated Care.

Clinical Domain	Description and Context	Interprofessional Implications
Acute alcohol-related hepatitis	• AAH has high short-term mortality[23] and any resumed drinking after severe AAH risks substantial mortality[24] • A standardized, consensus psychosocial approach to AAH evaluation and ongoing management is still emerging[9] • OLT performed in AAH patients have recently increased[25] where psychosocial evaluations are crucial and team collaboration essential	• Hepatology training may not adequately prioritize addiction and mental health and psychiatric training may not provide adequate preparation for end-stage disease and OLT signaling the need for substantial, ongoing interprofessional education • Expert, at-the-ready psychiatric consultation may be sparse for liver teams • Post-discharge AUD treatment must be prioritized and integrated into follow-up planning given relapse and mortality risks • Psychosocial OLT evaluations should be prioritized in AAH; unfavorable influences on psychosocial evaluation include: ○ Prevalent patient AMS ○ Patient and family incentives to conceal or minimize psych history due to OLT access concerns ○ Compressed transplant and disease timetables
Gastrointestinal bleeding	• Commonly prescribed SRI medications may increase bleeding risk due to platelet function effects[26] prompting some to advise SRI discontinuation before liver procedures[27]	• Risks and benefits of SRI medication use VS discontinuation must be carefully analyzed given competing medical and psychiatric needs ○ High psychiatric comorbidity in AUD/ALD (see later) ensures this will be a common clinical consideration for liver teams ○ *Either* choice (ongoing Rx use, therapeutic interchange, or taper/discontinuation) will necessitate interprofessional follow-up and coordination
Hepatic encephalopathy	• Insomnia is common in cirrhosis patients[28] and in alcohol users[29] increasing the likelihood that sedating medications may be prescribed to ALD patients which may, in turn, increase HE risk[30] • Cirrhosis patients are commonly prescribed BZD and opioids[31] which are HE risk factors[30,32,33] • HE is a common and preventable reason for expensive cirrhosis hospital readmissions[34]	• Collaboration is needed weighing the mental health risks of ongoing insomnia against the medical risks of using sedating medications • Opioids and BZD have numerous medical and psychiatric implications in terms of dose reduction and discontinuation • Lactulose titration problems are a common and preventable cause of expensive cirrhosis hospital readmissions[34] which could be precipitated by psychiatric or addictive disorders which can unfavorably affect treatment adherence
Visible Cirrhosis Stigmata (Ascites, Jaundice, Spider Angiomas)	• Ascites is a common reason for cirrhosis hospital readmission[34] • The discomfort and appearance of an ascitic abdomen is a common cause for psychological distress and physical pain which ALD patients may not be well-equipped to cope with and manage • Patients may report that others know when they have been drinking based on outward signs of their liver disease	• Fluid imbalances, poor diuretic management, and poor paracentesis planning are common preventable reasons for expensive cirrhosis hospital readmissions[34] which could be provoked by alcohol relapses and/or other psychiatric or addictive disorders which unfavorably affect treatment adherence • Visible signs of ALD may induce patient embarrassment and shame which can impact AUD treatment engagement which is already low[21]
Neuropathy	• Neuropathy is a common comorbidity in AUD and ALD patients[35] • Untreated neuropathy could lead to physical and psychological distress which, left untreated, could unfavorably influence relapse risks and mental health	• Gabapentin has literature supporting its off-label use for alcohol use disorder and related insomnia and negative affect;[36] it can be used in milder forms of alcohol withdrawal[37] • Pregabalin has some evidence for alcohol use disorder treatment and related anxiety; it has shown mixed results in withdrawal treatment[38] • Duloxetine is a commonly used Rx in neuropathy patients whose use in severe liver and kidney insufficiencies is discouraged • Thoughtful Rx selection can cover multiple clinical needs with fewer drugs

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Table 1 (*Continued*)

Clinical Domain	Description and Context	Interprofessional Implications
Overeating, obesity, and eating disorders	• Metabolic and alcohol-related liver injuries are closely related[39] • AUD and eating disorders are commonly comorbid[40] • Bariatric surgery patients are at risk for AUD and ALD[41] • Many sober ALD patients find themselves newly drawn to unhealthy foods and feeding behaviors	• In their commitment to treating liver disease and compulsive behaviors, ALD clinicians must monitor not only SUD but also eating behaviors and weight • Topiramate, with its off-label use in AUD,[42] renal clearance, and tendency to induce weight loss, may be an Rx consideration in ALD patients requiring AUD treatment amidst feeding and weight challenges
Polypharmacy	• The broad nature of ALD pathophysiology and its co-morbidities increases the likelihood of patient poly-pharmacy • Number of medications is predictor of cirrhosis hospi-tal readmissions[34]	• ALD patients may receive Rx from numerous clinicians including PCPs, psychiatrists, and hepatologists, among others; without coordination, these regimens may be redundant and excessive • Peer-to-peer outreach and coordination among clinicians caring for ALD patients take extra effort and may reduce patient Rx side effect burden
Alcohol withdrawal and AUD relapses	• Short- and long-term AUD relapse rates vary between 20% and 80%[43] • Alcohol relapses occur in varying trajectories after OLT[44] • Access to specialized AUD treatment and Rx is low in ALD patients[45,46] • Some AUD medications should not be used in liver disease while others must be carefully monitored given risks in end-stage disease and LT[47] • Many hepatologists do not feel comfortable prescribing AUD medications[48] • Shorter periods of pre-OLT sobriety (<6 months) have been shown to predict post-OLT drinking,[49,50] but "6-month rules" are discouraged as numerous other factors should be considered[51]	• Withdrawal can precipitate or complicate any medical clinic and hospital ALD patient presentation • ALD teams will need to decide whether BZD (which carry risks of abuse, cognitive and psychomotor side effects) are indicated for withdrawal or if other agents should be used[52] • Selection and follow-up of AUD Rx is optimal when psychiatric and medical professionals coordinate care given dosing adjustments in liver and kidney disease and OLT-related considerations[47] • ALD clinicians may understandably feel anger and resentment toward relapsing patients, sentiments which should be appropriately suppressed during clinical en-counters and processed elsewhere if needed[15] • MI is an invaluable communication skillset[53] to mobilize ALD patients toward change behavior; ALD patients uniquely trust their liver clinicians[21] making their use of MI particularly important • Liver patients may conceal substance use, particularly if they require OLT; questionnaires and addiction consul-tation increase liver teams' accurate detection of drink-ing[54] • Along with clinical interviews, toxicology, used in accor-dance with guidelines,[55] is an important tool to corroborate patient reports since liver patients may misrepresent their use[56]
Comorbid non-alcohol SUD	• Liver disease patients commonly have a history of polysubstance use[57] • Smoking is common in liver patients and may be increasing; tobacco use has been shown to predict post-LT alcohol relapse[49,50,58] • Marijuana use is common in ALD patients, increasing in the liver disease population, and associates with other psychosocial risk factors[7,59]	• ALD teams will frequently need to personalize SUD treatment to include Rx and psychotherapeutic inter-ventions for substances other than alcohol • Several SUD medications may be used in ALD patients and require careful consideration in end-stage disease and OLT[47] • Substance policies in OLT vary widely[60] making interprofessional collaboration key to promote ethical treatment and organ allocation • Use of other toxicological markers may be indicated as part of ALD care
Medical and recreational marijuana	• Distinction between medical and recreational MJ use can be blurry[61] • ALD patients have medical foci for pain, psychiatric comorbidities, and SUD meaning the risks and benefits of MMJ will be challenging to discern • Many OLT recipients use MJ and CBD[61] • Transplant center policies regarding MJ are heteroge-nous[60]	• Clinicians should have a working knowledge of MMJ for-mulations, dosing, and interactions and integrate the topic into their interviews and treatment plans • In cases where OLT patients are using MMJ, teams may opt to consult colleagues in the corresponding medical discipline (i.e. neurology when patients are treating neuropathy) to query if an MMJ regimen is optimal

Table 1 (*Continued*)

Clinical Domain	Description and Context	Interprofessional Implications
Prescription benzodiazepines and opioids	• BZD and opioids (alone and in combination) are commonly prescribed in cirrhosis patients including in high doses[31] • BZD and opioids have been associated with HE[30,32,33]	• ALD clinicians must not only assess the medical necessity and risks of BZD and opioids but also the impact these drugs have on sobriety and other SUD risks • Any alteration or discontinuation of these drugs will have medical and psychiatric implications requiring careful interprofessional coordination and follow-up
Insomnia	• Insomnia is prevalent in the end-stage liver disease population[62] • Insomnia can cause or exacerbate any number of psychiatric conditions and SUD and yet its pharmacological treatment risks worsening HE[30] or drug–drug interactions	• Treatment of insomnia will require ongoing interprofessional discussion given the ever-changing risks and benefits of Rx treatment given the dynamic natures of ALD and AUD • If available, non-Rx therapies, like CBTi may be prioritized for ALD patients[63]
Suicidal ideation	• Alcohol is a predictive factor in developing suicidal ideation and is implicated in a high percentage of suicides[64,65]	• Integrated ALD care entails screening for and responding to self-injurious behavior, SI, and SA meaning teams will benefit from suicide education and assessment training
Anxiety and mood disorders	• Anxiety and mood disorders are commonly comorbid with AUD[6] • Depressive disorders have been shown to impact post-LT mortality[66] • Psychiatric comorbidity may predict post-OLT alcohol relapse in ALD patients[50]	• As stated earlier, SRI medications treating mood and anxiety will need to have their benefits and risks scrutinized alongside other medical and psychiatric factors • Alcohol cessation and the stress of liver disease (and OLT) may unmask or worsen mood and anxiety which, in turn, risks alcohol relapse making ongoing psychiatric evaluation and treatment a priority
Physical, sexual, and emotional trauma	• PTSD patients are at higher risk of developing AUD; the two conditions are highly comorbid and treatment-seeking rates are low[67,68] • Many traumatized patients wait years to disclose past trauma which delays treatment and increases distress[69,70]	• Integrated ALD treatment will often include patients disclosing their history of abuse and/or trauma, sometimes for the first time; it is crucial that clinicians receiving such disclosures attentively listen, believe the patient, and authentically provide support[71] • Trauma could be a primary etiology and perpetuating factor of ALD making its ongoing pharmacological and psychotherapeutic treatment a priority
Personality disorders	• AUD co-occurs with challenging PD characterized by impulsivity and affective dysregulation[72] • The patient-provider therapeutic alliance in OLT is already complicated by the need for clinicians to advocate for patients while maintaining stewardship over donor organs	• PD in ALD can be challenging and may require teams to regularly meet for mutual support and emotional processing, stress and burnout management, and clinical collaboration, similar to a DBT consultation team[73] • Interprofessional education around PD and their management may be required • Addressing PD earlier in the ALD course may increase the likelihood of future patient success in OLT given the challenges PD pose in medical and transplant care[74,75]
Patient deception, defensiveness, ambivalence, denial, and poor insight	• Misrepresentation of substance use in OLT candidates has been documented[56,76] • Fear related to transplant access and death may motivate OLT patients to conceal their psychiatric and substance use history • Deception can elicit strong emotions in clinicians and may unfavorably affect how they perceive, interact with, and advocate for patients • ALD patients tend to have moderate to severe AUD[7] which may correlate with lower levels of alcohol insight and higher defensiveness • Ambivalence is a common obstacle in any person's journey toward change • Clinicians desire to fix problems and commonly feel a "righting reflex"[53] which can manifest in the overuse of an overly directive style which is often ineffective or counterproductive • "Insight" is a commonly used term and parameter in ALD and OLT clinical decision making but remains a poorly defined term	• MI training is a valuable skillset whose "spirit"[53] is a helpful guide for rapidly allying with ALD patients: ○ Partnership—collaborative conversation and joint decision-making recognizing that change is done "with" the person, not "to" them ○ Acceptance—empathy, affirmation, valuing, and unconditional positive regard for the patient as they are ○ Compassion—actively promote the other's welfare and give priority to their needs ○ Evocation—patients often already have much of what is needed to change, clinicians must aid in activating their strengths and resources • Observation and critique of teammates' interviews can train, hone skills, and avoid pitfalls like blaming, "gotcha," or overly paternalistic approaches • ALD and OLT teams should agree on a shared meaning of subjective terms like "insight" given its potential impact on decision-making and outcomes • A warm team culture facilitates clinicians can acknowledge their frustration with patients, seek and receive colleague support, and accept feedback or correction on their approach to deceptive patients

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Table 1 (*Continued*)

Clinical Domain	Description and Context	Interprofessional Implications
Low social support	• Social problems arising from alcohol use impact QofL,[77] AUD recovery,[78] and aspects of transplant adherence and outcomes[79] • Poor social support may predict post-OLT alcohol relapse[49,50]	• ALD teams may recommend that family members consider their own MH treatment and/or seeking support in communities like Al-Anon • The 12 steps of AA address aspects of repairing and strengthening relationships • Teams must be mindful of particularly mindful of relationship dynamics as ALD patients seek LDLT from their social networks
Stigma and terminology	• Stigma among clinicians and the public toward alcohol patients needing OLT has been documented[80] • The liver community has called for nomenclature adjustments to reduce stigma[9] • Concerns about alcohol relapse and graft damage have been shown to be the public's main concern about OLT in AAH patients[81] • A majority of survey respondents were at least neutral in their perceptions of AAH patients receiving OLT[81]	• ALD clinicians can model respectful terminology in their case discussions and documentation • With warmth and patience as well as a robust understanding of current scientific literature, ALD clinicians can work to correct stigmatized attitudes and policies they encounter in their institutions and workplaces • ALD clinicians will encounter alcohol and addiction stigma in themselves and the minds of patients and families which they can carefully address as part of clinical care

AA, alcoholics anonymous; AAH, acute alcohol-associated hepatitis; ALD, alcohol-related liver disease; AMS, altered mental status; AUD, alcohol use disorder; BZD, benzodiazepines; CBD, cannabidiol; CBTi, cognitive behavioral therapy for insomnia; DBT, dialectical behavioral therapy; HE, hepatic encephalopathy; LDLT, living donor liver transplantation; MH, mental health; MI, motivational interviewing; MJ, marijuana; MMJ, medical marijuana; OLT, orthotopic liver transplant; PCP, primary care physician; PD, personality disorders; QofL, quality of life; Rx, prescription; PTSD, post-traumatic stress disorder; SA, suicide attempts; SI, suicidal ideation; SRI, serotonergic reuptake inhibitor; SUD, substance use disorder; VS, versus.

sought out, built, and maintained. ALD clinicians who minimize the importance of such interpersonal factors do so at their own risk due to numerous clinical and logistical challenges (see later) that accompany ALD care integration. Disagreements, adverse clinical outcomes, and miscommunication inevitably occur on any clinical team and may be more pronounced and impactful amidst complex problems with high stakes like ALD. The culture of an integrated ALD team should be one where problems can be discussed openly and respectfully on the way toward a mutually satisfactory resolution.

Given alarming ALD epidemiological trends and widespread clinical needs, integrated ALD care models are likely to rapidly grow and require eventual additional multidisciplinary clinician recruitment. Team expansion is an opportunity to deliberately acquire individuals with the interpersonal capacity to participate in and promote interprofessional work alongside their primary clinical and research skillsets. By cultivating a strong spirit of collaboration and interprofessional curiosity, a unique and powerful collaborative culture can arise which can stand out to patients, rotating learners and trainees, and colleagues seeking consultation. All clinical and/or research achievements and recognition should benefit the careers and salaries of every clinician on the team.

ALD Clinical Model Design and Data Management

Depending on an institution's resources, personnel, and priorities, different models of ALD care may be more feasible than others. Figure 3 depicts ascending tiers of ALD care integration and interprofessionalism which clinicians might consider establishing to incrementally improve their clinical services from their current state. Unaffiliated clinicians may simply seek to contact their medical or psychiatric colleagues as the first step to future integration; inviting a colleague to attend seminar to present a talk is a good early strategy. Clinicians who already share some informal connections (periodically reciprocally referring patients to each other's clinics and providing some clinical updates, for example) may wish to build more substantive relations and opt to begin an open-door quarterly seminar where ALD cases are discussed, interprofessional education offered with continuing medical education credits, open discussions held, and relationships developed.

Multidisciplinary clinicians already united within a single institution's mission, facilities, and professional culture may seek to further refine specialty ALD care by developing new specialized connections or workflows among distinct departments and service lines. This could take several forms such as liver clinicians assisting an addiction clinic in developing a curriculum which contains liver topics and hepatology referrals or a psychologist dedicating a half-day per week in her clinic to referrals generated from liver colleagues with whom she regularly corresponds. Arguably, co-location is the epitome of ALD care integration given the high-grade, coordinated specialty care available to ALD patients receiving care from cross-trained clinicians who can easily and rapidly

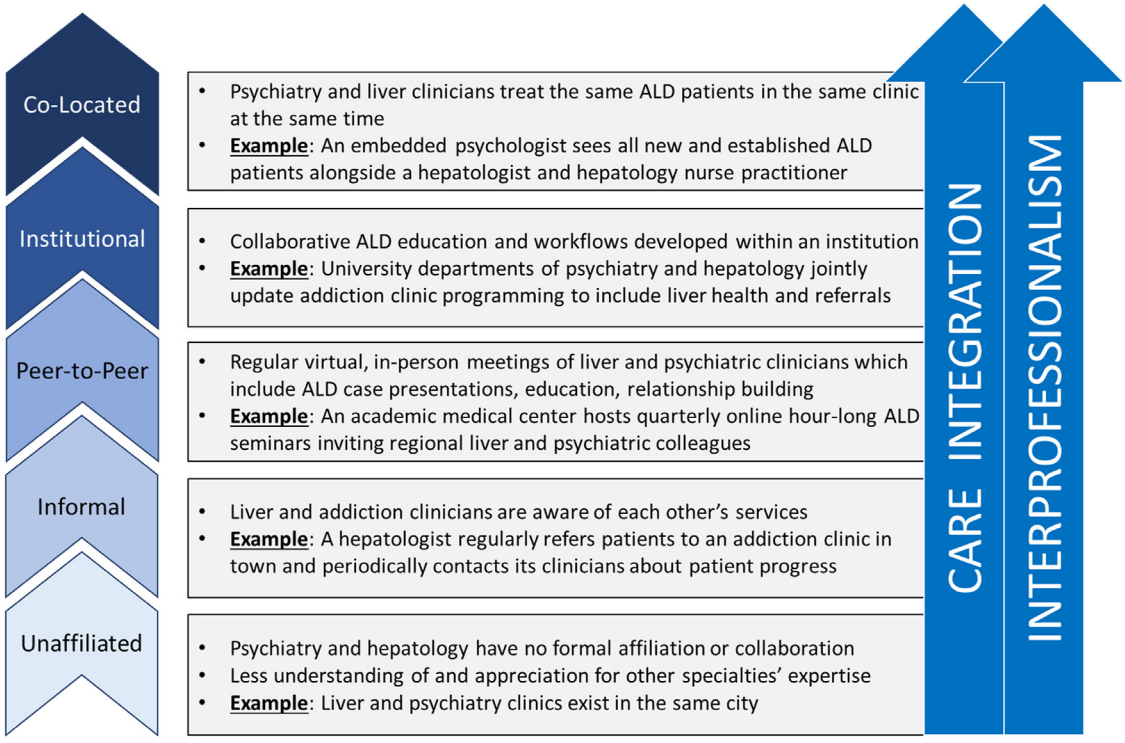

Figure 3 Ascending tiers of ALD care integration and interprofessionalism.

combine, adjust, and personalize comprehensive medical and psychiatric treatment plans. Figure 4 depicts how a morning evaluation clinic might run with each patient remaining in a single examination room while team members rotate. Brief time spent between evaluations allows team members to personalize and fine tune evaluations in interdisciplinary fashion, a capacity unparalleled in other ALD care environments.

Integrated ALD care generates large amounts of multimodal data including rich qualitative psychosocial data from serial clinical interviews, psychometrics, imaging, vital signs, lab values including toxicology, medical history, and physical examination findings. Attention to data acquisition and management strategies (Table 2) in the design phase will ensure that teams can obtain and review a wide array of data to guide clinical care and facilitate research. A case manager role can be an effective way to coordinate integrated ALD care inside and outside the clinic, collate clinical data, and lead multidisciplinary case review meetings (see later). In our era of open notes where patients and families have access to the medical record, teams must be attentive to their verbiage around sensitive topics to maintain therapeutic alliances and honor the spirit of "do no harm."

Institutional Leadership Support and Facilities

Integrated ALD care will require resources from the health system in terms of time, money, facilities, and personnel. The initial group of clinicians seeking to integrate care may consider preparing a written proposal detailing their development plan and then meet face to face with relevant leadership stakeholders (i.e. psychiatry, nursing, transplant, social work, internal medicine) about the next steps. Such meetings are also effective ways to build or strengthen interdepartmental relationships.

It would not be unexpected for an integrated and co-located ALD clinic, for example, to use the physical facilities and clerical resources of a transplant clinic while staffing it with internal medicine physicians, nurses, and advanced practice providers alongside several psychiatry clinicians. Given ongoing severe psychiatric and addiction clinician shortages, salary support flowing from medicine or transplant surgery to psychiatry may be used to secure and protect ALD time allocation. ALD teams may request that physical space be optimized to facilitate integrated care (i.e. aesthetically appropriate interview rooms within a medical clinic, medical equipment, and exam space within an addiction clinic). Such diverse mixtures of resources and personnel will only be possible with ongoing leadership support. Teams will also want to develop workflows around how to refer patients for clinical services that may not be offered within their care venue (i.e. calling ambulances for medical or psychiatric emergencies, referrals to residential rehabilitation or intensive outpatient addiction programming, etc.).

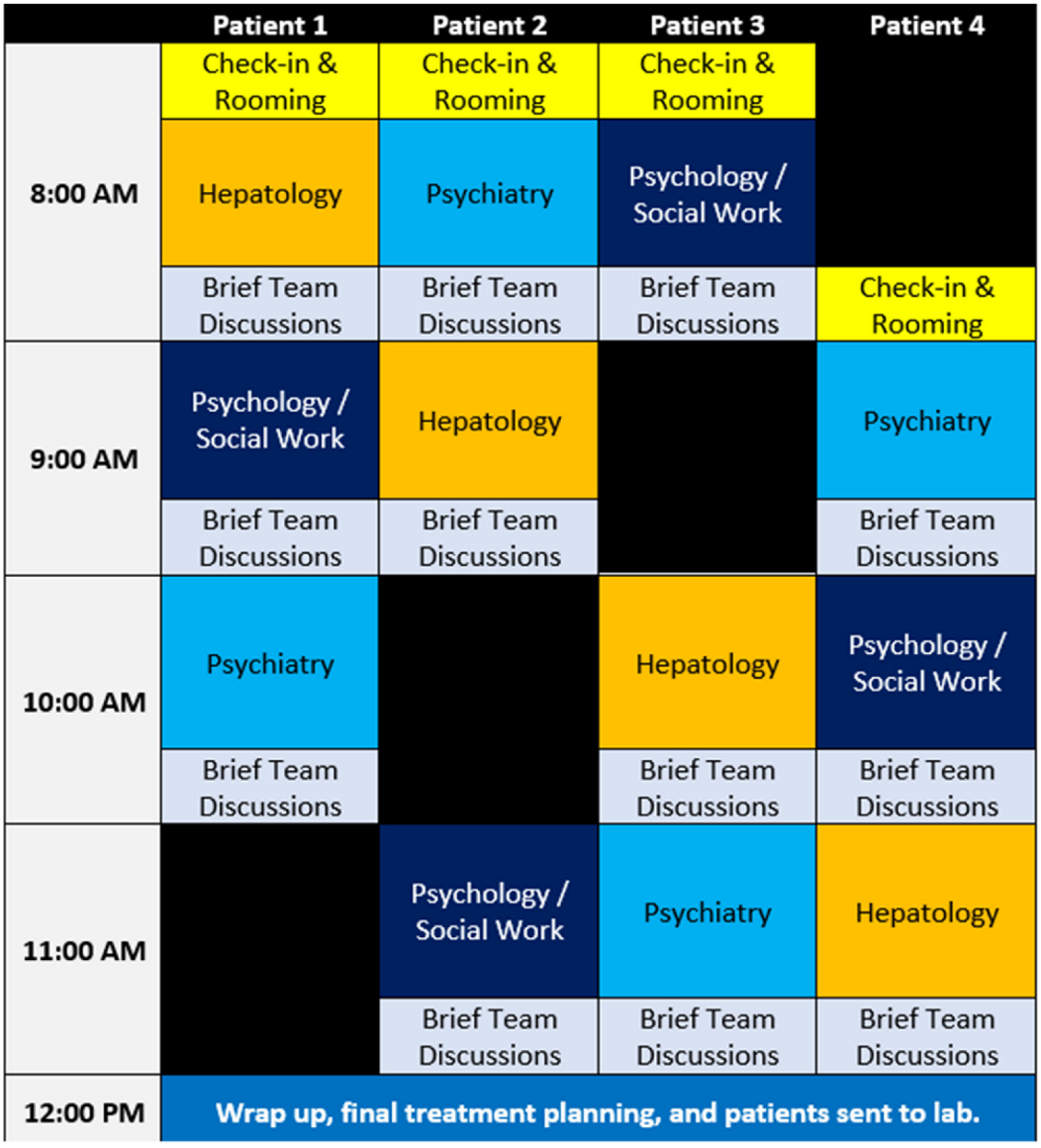

Figure 4 Sample half-day co-located ALD clinic new patient evaluation schedule.

THE PROCESS OF ALD CARE INTEGRATION

Initiation

Precise early steps and processes of ALD integration will vary greatly according to team composition; individual and institutional relationships, resources, and timelines; and the tier and model design selected (Figure 3). There are numerous permutations of how ALD care can incrementally become more integrated from its present state. Several examples illustrate potential integration initiation points and trajectories:

1. A hepatologist presently unaffiliated with any psychiatric or addiction clinicians is increasingly concerned about the size of her ALD patient census and her patients' ongoing drinking. She begins asking more drinking-related interview questions, dedicates a section of her clinic note to alcohol, and pilots use of a validated alcohol screening questionnaire (Alcohol Use Disorders Identification Test). She submits a written proposal to department leadership for an ALD nurse case manager (Figure 2) to monitor her ALD patients' medical and psychiatric care including acting as a liaison among their various clinicians.
2. A hepatologist perceives discontinuities and inefficiencies in the way her ALD patients access AUD treatment services within her institution. To explore integrative remedies, she contacts one of the health system's psychiatrists to informally brainstorm over coffee about problems and possible solutions.

Table 2 Data Acquisition and Management Strategies for Integrated ALD Care.

Information Type	Strategies
Interview data and past medical and psychiatric histories	• Agreed-upon divisions in history gathering duties may boost efficiency and increase predictability as to the location and storage of key data points • Well-designed note templates and well-constructed prose ensure that information can be located efficiently for clinical and research purposes
Laboratory values (including toxicology) and imaging	• Teams may opt to design risk-stratified protocols for varying levels of data gathering personalized to medical and psychiatric acuity • Standing orders may increase likelihood that data are reliably obtained • Both medical and psychiatric clinicians can include reminders for labs and imaging in their patient interactions
Psychometrics	• Questionnaires can be pushed to patient through the electronic portal before and between clinic visits • Integrate questionnaires into phone calls between clinic visits where patient status and treatment progress are queried and updated • Collate psychometric data and display in ALD Clinic dashboards alongside medical and toxicological data for review during team meetings
Psychotherapies and mutual support communities	• Elicit and record patient treatment preferences and any past successes, sobriety periods, and unsuccessful treatment • Teams should solicit interval updates from outside therapists and facilities treating ALD patients • Ask patients to keep logs or collect signatures for each recovery community meeting (i.e. Alcoholics Anonymous) attended
Patient behavior and adherence	• Psychosocial clinicians should be documenting and updating meaningful mental status examinations • Documented patient adherence to clinic visits, lab draws and imaging appointments, and clinic communications can be important data guiding treatment planning • In rare instances where patient behavior may impact their ability to continue to access care services, neutral, succinct, and timely clinician documentation should be in the chart

ALD, alcohol-related liver disease.

3. A hepatologist working alongside psychiatrists, psychologists, and social workers in an established co-located ALD clinic reviews and implements treatment guidelines for AUD management in ALD from the American Association for the Study of Liver Diseases[19] and European Association for the Study of the Liver.[20] She also enrolls in an upcoming motivational interviewing training to improve her alcohol-related conversations with patients and families.

Scopes-of-Practice

The massive breadth of ALD pathophysiology and its high clinical stakes demand a diverse care team with proportionally broad scopes of practice which overlap and complement each other. For example, both psychiatrists and hepatologists may prescribe AUD medications. Social workers and psychologists both have psychotherapeutic expertise. To reduce frustrating redundancy and confusion and to optimize team operation, team roles must be clearly delineated agreed upon by all parties.

There are many training backgrounds that can fill the general roles and duties pertinent to ALD care. Table 3 reveals not only how multiple training backgrounds can fill similar roles but also the flexible combinations of professionals that could be integrated into innovative ways in different successful models. As more clinicians collaborate with complimentary clinical skillsets and blended scopes of practice, it is easy to conceptualize how new ALD care models can emerge which are simultaneously comprehensive enough to take on a severe and chronic disease like ALD while being flexible enough to meet individual patient needs. ALD patients trust their medically trained clinicians about alcohol and liver matters[21] meaning these clinicians can play an essential role in reducing stigma around mental health and substance use thus facilitating patient interaction with psychiatric colleagues.

The process of further expanding a clinician's scope of practice can be daunting particularly for specialists who have already spent years accumulating and refining

Table 3 Integrated ALD Care Scopes-of-Practice by Training Background.

Training Background	Clinical Duties					
	Liver Disease Management	Psychotropic Medication Management	AUD and Psychosocial Evaluation	Motivational Interviewing and AUD Treatment Engagement	SUD and Psychiatric Disorder Psychotherapy	Case Management and Outreach
Hepatologist	X	X		X		
Hepatology APP	X	X		X		
Hepatology RN	X			X		X
Social Worker			X	X	X	X
Psychologist			X	X	X	
Psychiatric APP		X	X	X	X	
Psychiatrist		X	X	X	X	

APP, advanced practice provider; AUD, alcohol use disorder; RN, registered nurse; SUD, substance use disorder.

niche expertise. ALD's vast scope requires its clinicians to "re-generalize" their specialty skillsets to include relevant elements of medical or psychiatric training. It is a sizable request to ask transplant hepatologists and addiction psychiatrists, for example, to pursue additional alcohol and liver training, respectively, for which they will receive no additional pay or licensure designation and amidst all their other personal and professional endeavors. Yet there simply may be no other way to build the interprofessional and integrated teams that ALD care requires.

Interprofessional Education and Staff Training

Integrated ALD clinicians benefit from additional training by colleagues from other disciplines. Such training can be formal didactics provided in local case conferences or during professional society annual meetings. More often, however, interprofessional education is provided clinician-to-clinician while collaborating on clinical care or research projects. This person-to-person information transfer highlights the unique value in strong relationships, close clinical proximity, and clear and frequent communication. Several scenarios show the methods and value of additional team training:

1. After the announcement of an integrated ALD clinic, clerical and call center staff in hepatology have concerns about receiving calls from ALD patients with psychiatric emergencies trying to reach their psychiatric or addiction clinicians. The ALD psychologist and psychiatrist hold a lunch hour meeting reviewing relevant institutional policy and procedure and invite open discussion. They also encourage staff to contact them directly when additional assistance is needed.
2. Hepatology's more frequent use of alcohol biomarkers raises several questions with medical nurses tasked with following up on the tests and their results. Nursing leadership invites psychiatry and social work to present on technical and practical aspects of the use of toxicology in patients with addiction. Time is set aside at the end of the meeting for candid discussion.
3. An addiction clinic recently launched a service line dedicated to ALD patients. Psychiatric clinicians are uncertain how to respond to patients presenting with altered mental status. Time is set aside during a weekly team meeting where hepatology presents on hepatic encephalopathy and medical emergencies. A protocol is established by which medical consultation can be obtained when needed.

Multidisciplinary Team Meetings

An efficiently run and well-attended meeting is the backbone of integrated ALD operations. Two scenarios depict how efficiently-run and well-attended multidisciplinary team meetings can favorably impact ALD care:

1. The case manager of a co-located ALD clinic contacts a patient by phone who missed recent hepatology and psychiatry visits. The psychometric and interview data she gathers during the call indicates the patient is in psychological distress (elevated depression and anxiety questionnaire scores, missing work due to not feeling well). During that week's team meeting, the entire ALD team reviews these data against the backdrop of recent lab trends which include worsening liver function tests and a note from the lab that patient declined toxicology testing. Concerned about a relapse, the team contacts the patient that day for urgent appointments planning to adjust medication and psychotherapy regimens.
2. Academic clinicians from psychiatry, addiction medicine, transplant surgery, and hepatology hold quarterly lunch hour case conferences which discuss ALD/LT

patient cases accompanied by interprofessional didactics. Talks are also streamed online to invited regional colleagues and archived for reference. With her new ALD training and acquaintances, a hepatologist asks a psychiatrist about collaborating on inpatient addiction consultation for the university hospital's GI/liver service.

Patient Education Materials

Integrated ALD care should be reflected in the education materials that patients receive. Online or written materials orienting patients to their ALD care should feature psychological and behavioral topics alongside those from hepatology and pharmacy. Supplemental Figure A shows sample pages from an actual patient ALD booklet which moves seamlessly from detailed discussions of liver decompensation, diet, and medications to psychological topics like cycles of habit, coping strategies, and decision-making principles, among others. Mirroring the pathophysiological realities of ALD, patients should ideally perceive little separation between their liver care and their mental health in what they read and experience in clinic.

Connection to the Transplant Center and Health System

One of the goals of improving ALD care integration is to intervene adequately earlier in the disease process so that patients will not require LT. Many patients, however, will still require LT evaluation and integrated ALD clinics can play a large role in maximizing chances of successful transplant in several ways. Three main LT obstacles and delaying factors for ALD patients are (1) adequate AUD treatment, (2) accumulated sober time, and (3) treatment of psychiatric comorbidities. ALD patients who have previously received integrated care are much more likely to have had these matters addressed prior to LT and have treatment plans in place which satisfy LT listing criteria thus easing the downstream burden on the transplant center. Integrated ALD care elicits and documents large amounts of multimodal data including toxicology which, if accessible to the transplant center, expedites transplant clinicians' understanding of ALD patients' medical and psychiatric pathology enabling them to more adeptly treatment plan and risk stratify. The degree to which ALD clinicians acquire their own relevant transplant knowledge bases and skillsets only further facilitates ALD patient success in transplant.

Integrated ALD clinicians should remain aware of and involved in other addiction needs and initiatives in their health systems. Other institutional initiatives may proffer additional opportunities for ALD care model expansion such as AUD care in less severe liver disease in the primary care setting or in vulnerable populations. Another example would be a new inpatient addiction medicine consultation service benefitting from ALD-specific training which in turn generates numerous referrals for an integrated ALD outpatient clinic.

The need for integrated addiction care is not confined to AUD treatment in hepatology and other medical or psychiatric colleagues may turn to integrated ALD clinicians for ideas for improving the treatment of other challenging medical substance use disorder (SUD) populations (i.e. patients with comorbid endocarditis and severe opioid use disorder). In fact, lessons learned from ALD care integration could be a return on investment presented to the health system and departmental leadership during planning stages.

Quality Improvement, Research, and Future Directions

Integrated ALD care is a growing field within hepatology and will benefit from close attention to quality improvement (QI) and study. Several multidisciplinary outcomes and metrics (Table 4) may be worth tracking as more institutions adopt various types of integrated ALD care models. As described earlier, an open and warm team culture undergirded by strong interpersonal relationships will facilitate QI information becoming rapidly integrated into team interactions and clinical operations toward problem resolution and improvement.

There are several future directions for clinical development and research regarding integrated ALD care.[22] The COVID-19 pandemic has brought about the widespread usage of virtual visits which may play a role in improving integrated ALD care access and adherence. More work is needed to innovate and understand what team professional compositions (i.e. hepatologist + psychiatric nurse practitioner + addiction social worker) and which visit types (in-person, virtual, phone) and frequencies are optimal. Eventual controlled and multicenter studies will be required to properly evaluate novel integrated care models and establish standards of care.

ALD CARE INTEGRATION PITFALLS

A detailed discussion of potential pitfalls to efforts integrate psychiatric, social, and medical care in end-stage disease and transplant and their possible remedies exist elsewhere.[15] Additional ALD-specific integration pitfalls to consider include over-ambitious patient recruitment resulting in care access problems in a medically ill liver population, vague referral criteria resulting in an overly heterogenous population (i.e. primary non-alcohol SUD, mild liver disease not requiring hepatology care, patients unwilling to speak to psychiatric clinicians), or ill-conceived and/or forced integration efforts which supersede actual clinician

Table 4 Potential Quality Improvement and Outcome Metrics for Integrated ALD care.[14,22]

Psychiatric	Psychometric score improvement (QofL, anxiety, depression, sleep, et cetera)
	Negative toxicology (alcohol, other drugs, nicotine) and rates of discordance with patient reports
	Reduced alcohol consumption per subjective report and quantitative biomarkers (i.e. PEth)
	Rates of alcohol treatment engagement, retention, and completion (residential rehabilitation, intensive outpatient, group and/or individual psychotherapy, mutual support group milestones [i.e. AA sobriety coins])
	Reduced alcohol cravings (subjective report or validated questionnaire)
	Rates of regained sobriety and alcohol treatment reengagement after relapse
Medical	Improved LFTs (AST, ALT, Tbili, albumin) and MELD scores
	Reduced healthcare utilization (hospital admissions, ER visits)
	Rates of improved symptoms of decompensated cirrhosis and averted LT evaluations
	Reduced mortality
	Expedited LT timetables (i.e. accelerated time-to-listing)
	Improved LT outcomes (lower rates of de-listing, rates of pre- and post-transplant relapse, graft failure, hospital readmission, post-transplant return-to-function)
Other	Patient and family satisfaction scores and feedback for in-person and/or virtual visits
	Clinical and administrative personnel satisfaction scores and feedback regarding teamwork quality and clinical operations
	Satisfaction scores and feedback from intra- and extramural referring clinicians
	Cost savings generated from reduced healthcare utilization rates (hospital admissions, ER visits)
	Patient access and utilization rates (no-shows, cancellations, intra- and extramural referrals, et cetera)
	Reimbursement and revenue generation

AA, alcoholics anonymous; ALT, alanine aminotransferase; AST, aspartate aminotransferase; ER, emergency room; LFT, liver function tests; LT, liver transplant; MELD, model for end-stage liver disease; PEth, phosphatidylethanol; QofL, quality of life; Tbili, total bilirubin.

buy-in and collaborative capacity. Ideally, ALD clinicians are aware of these humanistic and logistical obstacles early in preparation phases, address them in proposals submitted to leadership, and work to minimize or prevent them during integrated care implementation.

ALD care integration exists in some form in many transplant centers but is much less common elsewhere in hepatology. Given the concerning alcohol epidemiological trends and unique aspects of ALD pathophysiology, the field of hepatology is recognizing the benefits of integrating psychiatric and addiction treatment into liver care. Early models of feasible care integration have emerged in recent years but much more work is needed to develop and study them. If the future of ALD care is an integrated approach, it will be jointly led by medical and psychiatric clinicians who seek to provide collaborative and comprehensive care while seeking their own lifelong interprofessional education and training.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Dr. Winder–conception of the article, drafting of the original and revising manuscript; Dr. Fernandez–conception of the article, reviewing and editing the manuscript; Dr. Mellinger–conception of the article, reviewing and editing the manuscript.

CONFLICTS OF INTEREST

The authors have none to declare.

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SUPPLEMENTARY DATA

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