

RENALWARE®

List of Features & Technical Specifications

Airslie

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User Functions & Dashboard

- Account Registration
- Update Profile/Password
- Retrieve Forgotten Password
- User Letters
- User Messages
- Manage Snippets
- Patient Bookmarks
- Electronic CCs

Superuser Functions

- Manage Event Types
- Manage Drug List
- Manage Modality Types
- Configure PD Bags
- Manage Primary Care Physicians
- Empty System Caches
- Run File Imports
- View Feedback
- Schedule login screen alerts/notifications
- Superuser record deletion
- Manage “hidden users”
- Configure Nags
- Manage Vaccination Types
- Track UKRDC Activity
- Outgoing Documents Listing
- Letter Descriptions management
- Clinic add/edit/(soft) delete functions
- Reports menu (*See Appendix 2*)
- Deleted Letters display

Administrator Functions

- Manage Users (Set roles)
- Manage Hospital Units/HD Sites
- Manage Cannulation Types
- Manage HD Dialysers
- Request Form Print History
- View Pathology Request Form Algorithm
- Edit Email Templates
- Manage Vaccination Types
- Create and edit Event Types

System Functions

- Snippets for insertion into Letters, Events
- Global Directory of People & Addresses (for Letters, Contacts)
- Internal Messaging system
- Quick Search (by full or partial name, hospital number, NHS number)

Patients Lists & Functions

- Patients List
- Add Patient (Manual entry)
- Deceased Patients
- “Worryboard”
- Admission Requests (“TCI”)
- Admission Consults
- Admission Inpatients

Renal Lists & Functions

- Appointments
- Clinic Visits
- Transplant Wait List
- Live Donors List
- Ongoing HD Sessions
- HD Patients with un-met preferences
- Letters List with filters
- ESA Patients
- Audits
- AKI Alerts (*site HL7 feed dependent*)
- Clinical Studies
- Renal Registry Checks (“pre-flight”)
- Renal Safety Alerts

MDM Lists & Screens

For Multidisciplinary Meetings

- HD
- PD
- Transplant
- AKCC (formerly Low Clearance)

Clinical Studies

- Manage study lists
- Add/Remove patients to studies
- Display study status on patient screens

Internal Messaging

- Send message to other user(s) regarding a given patient
- View historical messages (Inbox/Read/Sent)
- Filter message history by patient
- Check message status (read/unread)
- View messages on dashboard

Letters Module

- Create, Review, Archive letter workflow
- Simple, Clinical, and Clinic Visit letter formats
- Automatic specialty data inserts e.g. for HD, PD, AKCC, Transplant
- Insert user-created snippets into letters
- Simplified recipient and CC selection via Patient Contacts
- RTF text formatting in body of letter
- Add electronic CCs to other Renalware users
- View DRAFT and PENDING REVIEW letters on user dashboard
- Download or Print PDF version
- Batch printing of letters
- QR code links to online articles in letters
- Electronic transmission e.g. to local EPR systems (site dependent)
- Letters sent to GPs via NHS GP Connect (site dependent)

Patient Functions: General

CLINICAL SUMMARY

- Problems List
- Current Prescriptions
- Recent Letters
- Recent Events
- Recent Admissions
- Recent Consults

DEMOGRAPHICS

- View and Edit
- Update GP & Referral Info
- Enter date and cause of death
- Change Letter CC preferences
- Change Renal Registry preferences
- Change Renal Patient View preferences
- Psychosocial data

CONTACTS

- View and add contacts from Directory
- Assign Contact Type
- Contacts used as Recipients & CCs in letters
- Contact Types are configured at system level

PROBLEMS

- Enter, Edit and Archive Problems
- SNOMED code selection (searchable)
- Attach one or more Notes to a given Problem
- Drag-and-drop sorting of Problems List
- Display of Archived Problems

CLINICAL & RENAL PROFILES

- Record Allergies with date
- Smoking, Diabetes and Alcohol Histories
- MRSA/MSSA Swab logs
- ESRF info entry and display
- Primary Renal Diagnosis (PRD)
- Display historic EDTA Diagnosis
- Renal Registry/UKRDC Comorbidities
- Low Clearance Profile
- Body Composition Records
- Iron Dose History
- Psychosocial History
- Address at ESRF Date (for Renal Registry)

MODALITY HISTORY

- Track start and end date of Modalities
- Renal Reg "reason for change" for HD/PD
- "Death" Modality entry prompts Cause of Death entry (EDTA codes)

PATHOLOGY

- Historical results (selected pathology tests)
- Historical results (detailed)
- Custom pathology views
- Current (latest) pathology results display
- Complete investigations list
- Historical display of a given result
- Required Pathology Tests
- New Patient Rule (generate requests)
- Results charting (1m, 3m, 1y, 3y, 10y)

PRESCRIPTIONS

- Add and terminate prescriptions
- Filter drugs by drug type (on adding and displaying)
- Current and Historical prescriptions lists
- "Give on HD" option in prescription form and recording when administered
- Print "Home Delivery Form" option
- dm+d (dictionary of medicines and devices) drug selection (lists auto-updated weekly)
- Outpatient prescriptions entered and recording when administered

CLINIC VISITS

- Enter clinic visit and observations
- Insert Snippet option for Notes field
- Create Clinic Visit Letter option for given visit
- Display Clinic Visits without letters
- Display upcoming Patient Appointments

ACTIVITY SUMMARY

- Timeline display of important patient events
- Lists letters, clinic visits, events, admissions, and consults
- Additional activities may be displayed in the future

VIROLOGY & VACCINATION

- Vaccination Entry and History
- Virology Profile
- Covid-19 status

Patient Functions: Renal

ACCESS SUMMARY

- Enter current Access Profile
- View Profile History
- Access Plan Recording
- Access Procedures History
- Access Assessment History
- 'Ease of Assessment (MAGIC)' needling assessments

PD SUMMARY

- Current PD Regime
- Automated calculation fluid volumes including Weak/Medium/Strong bags
- CAPD/APD Regimes History
- Peritonitis Episodes
- Exit Site Infections
- PET/Adequacies
- PD Training Session

HD SUMMARY

- HD Profile
- Print HD Session Form
- Access Profile
- Patient HD Preferences (site and schedule)
- Dry Weight logging
- Enter HD Session (or DNA Session)
- List Recent Sessions or View All
- HD Audit (available in HD MDM screen)
- HD Scheduling module (assign HD stations)
- HD Slot Request option to track patients waiting for HD slots
- Patient Group Directions recording option for HD sessions; list of PGDs configurable by site
- HD Acuity Assessments

TRANSPLANT RECIPIENT SUMMARY

- Recipient Workup
- Transplant Waiting List Registration
- Recipient Operations
- Renalware transplant status/Tissue Typing status mismatch detection

TRANSPLANT DONOR SUMMARY

- Donor Summary
- Assignment of recipient(s) to donor
- Donor Workup
- Donor Operations
- Investigation logs

PATIENT-RECORDED OUTCOME MEASURES (PROMS)

- EQ5D Questionnaire entry and history
- POS-S Questionnaire entry and history

COMPLEX CHARTS/ANAEMIA

- HGB, Ferritin, CRP charts
- ESA Prescription History
- Iron Clinic Events
- Bone Profile
- Bone/Anemia charts

ADVANCED KIDNEY CARE (AKC)

- Clinical Frailty Score (CFS) Entry
- CFS History
- CFS “Nags” when missing
- Advanced Care Plans Entry/History

Events

Renalware’s Events module is one of the most powerful and flexible features of the application, enabling an enormous variety of information to be entered via simple or highly-structured forms. The simple or “general” event forms have Event Type, Date, and free text Notes fields (as well as logging user and timestamp data). Complex event forms use JSON fields to capture virtually any kind of information, thus enabling long form data entry and context-specific dropdown menus or other select options. There is also an option to insert user-defined “snippets” into text fields.

Events may be created and edited by administrators and there is an option to convert any given event into a PDF at the time of entry and then send to the hospital’s EPR system (*requires appropriate systems integration*).

COMPLEX EVENT TYPES

Examples of complex event types include the following:

- Renal Biopsy Transplant
- Investigation
- Clinical Frailty Score
- Medication Review
- Transplant Review
- Dental Study
- Foot Study
- Advanced Care Plan
- Swab
- Renal Biopsy Native
- Vaccination

GENERAL EVENT TYPES

Examples of general event types are listed in *Appendix 1*. (Renalware includes a standard set and each hospital administrator can create additional ones.)

Additional Functionality

LETTER LISTS

- DRAFT: Toggle, Preview, Edit
- PENDING REVIEW: Toggle, Preview, Edit
- ARCHIVED: Toggle or View (HTML, PDF)
- Print Queue with filters and Print All option

BOOKMARK & ALERT OPTIONS

- Add/Remove from User bookmarks
- Mark bookmark as 'Routine' or 'URGENT'
- Add/Remove from global "Worry Board"
- Add patient "Alerts" (multiple permitted)
- Edit bookmarks option

CLINICAL RESEARCH

- Patient participation in research studies displayed on Clinical Summary screen

ALERTS & "NAGS"

- Allergy status & warnings
- Covid-19 status
- Clinical Frailty Score missing
- Free text user alerts
- HD Session DNA in last 30 days nag
- AKI Alerts
- Renal Safety Alerts based on site-specified criteria (run as scheduled task)

LINKED PATIENT FILES

Enables uploading and storage of digital images, documents, and other non-Renalware-generated files. *Current options include:*

- Histology Images
- Histology Report
- MRI Images
- MRI Report
- Other Radiology Images
- Other Radiology Reports
- Echo Images
- Echo Report
- ECG
- Misc Letter
- Misc Discharge Summary
- Misc Documents

Appendix 1: General Events

Access - Anaesthetic Review	Iron Clinic
Access - Assessment	Joint CAPD/Diabetes
Access - Clinic	Joint Transplant/Diabetes
Access - Clinic Review	Joint Transplant/Renal
Access - Comment / Others	Letter
Access - MDT	Live Donor
Access - Surgery	Low Clearance
Acute Team	MDM--ADPCK
Admission	MDM--HD Access
A&E	MDM--Liver Renal Virology
A&E - Anaesthetic Review	MDM--Radiology
Anaemia	MDM--Renal Biopsy
Asked to see	MDM--Renal Sickle
Biopsy Meeting	MDM--Renal Urology
Blood Test	MDM--Transplant Waiting List
CAPD	Medication Review
CAPD Nurse Home Visit	Meeting
CAPD Outreach Clinic	Nephrology
Clinic - Access	Nutrition Assessment
Clinic - AKI	Other/Unknown
Clinic - Anaemia	Outpatients
Clinic - CAPD	Patient Discussion
Clinic - Clinic	Patient Encounter (Seen on)
Clinic - HD	Patient Form Letter
Clinic - Home HD	Patient Review
Clinic - Joint clinic	PD Line Change
Clinic - Live Donor Assessment	Pharmacist
Clinic - Live Donor FU	Physiotherapist
Clinic - Low Clearance	Plasma Exchange
Clinic - Misc / Others	Prescription change
Clinic - Other	Psychology/Psychiatry
Clinic - Outreach	Referral
Clinic - PD	Renal Biopsy Native
Clinic - Renal Obesity	Renal Biopsy Transplant
Clinic - Renovascular	Renal Palliative
Clinic - Vasculitis	Renal Supportive Care
Clinic - Walk In	Renal Unit
Complaint	Research
Conversation	Result Entry/Review
Counsellor Meeting	Social Worker
Diabetes	Swab
Dialysis Unit	Telemedicine Assessment
Dietetic assessment	Telephone Call
Dietician	Transplant
Email	Transplant Coordinator
Fax	Vaccination
Fistulaplasty	Vascular Lab
GP Follow-Up	Walk-in
Haemodialysis	Ward
Haemodialysis Unit	Weight Management
Home Visit	X-ray Meeting
Investigation	

Appendix 2: Technical Notes

TECHNICAL OVERVIEW

Renalware is a modern Ruby on Rails and PostgreSQL web application. The application is actively maintained, with regular updates to Ruby, Rails, operating system packages and third-party dependencies. Security updates are reviewed and applied as part of the normal maintenance process.

Renalware is distributed as a production Docker image and is designed for container-based deployment. It can be deployed to managed cloud platforms, including Microsoft Azure, AWS, Google Cloud and Oracle Cloud Infrastructure, or to on-premises Linux infrastructure where required.

The most common deployment model is Microsoft Azure, using Azure App Service or Azure Container Apps, backed by managed PostgreSQL and persistent storage for uploaded/generated documents. (See below for more information on Azure deployment.) Equivalent architectures can be implemented on other cloud providers using their managed container, database, storage, networking and monitoring services.

For hospitals requiring local hosting, Renalware can also be deployed on cloud-hosted or on-premises Linux virtual machines using Docker Compose or an equivalent container orchestration approach.

The application supports standard operational controls expected in a clinical environment, including environment-based configuration, managed secrets, TLS termination at the platform/load-balancer layer, database backup and restore, audit logging, role-based access control, and integration with external identity providers such as Microsoft Entra ID/OIDC or LDAP where configured.

SYSTEMS INTEGRATION

Renalware supports a range of standard NHS and renal-specific integration points. Integration requirements are normally confirmed during implementation, as local Trust message formats, identifiers, routing, middleware and operational processes vary by site.

HL7 Patient and Clinical Feeds

HL7 integration is customised per site, and we will work closely with the Trust integration team to confirm message types, field mappings, identifiers, acknowledgements, error handling and testing arrangements.

Renalware can process incoming HL7 feeds including:

- Patient demographics and identifiers
- Pathology results
- Outpatient appointments
- Inpatient/admission information
- AKI alerts and AKI scores
- Site-specific HL7 messages where required

Renalware can also generate outbound HL7 messages, including MDM document messages used to send PDF or RTF versions of renal letters back to the Trust EPR.

UKRDC and Patients Know Best

Renalware supports automated encrypted XML exports to UKRDC, including scheduled generation, local audit/logging and secure onward transfer. Where required, this also supports the UKRDC route onward to Patients Know Best.

The UKRDC integration has been developed in collaboration with the UK Renal Registry and supports current UKRDC dataset requirements (version 5) for renal registry reporting. Renalware was one of the first to implement the new UKRDC XML standard.

GP Connect and MESH

Renalware supports secure sending of GP letters over NHS MESH using the GP Connect Send Document workflow.

The implementation includes MESH message generation, transmission logging, response handling and operational monitoring to support reconciliation and troubleshooting.

Dialysis Machine Integration

Renalware supports dialysis machine integration, including:

- Bi-directional transfer of haemodialysis profile and dialysis session data with Diaverum
- HL7 dialysis session ingestion from compatible dialysis systems including those from Fresenius, B. Braun [*Under active development*].

NHS Blood and Transplant

Renalware can generate NHS Blood and Transplant return data (3 monthly and annual) in XML format as required by NHSBT for electronic returns.

dictionary of medicines and devices (dm+d)

Renalware supports scheduled synchronisation with the NHS dm+d drug dictionary, helping maintain current drug, product, route and unit-of-measure reference data.

(See <https://digital.nhs.uk/services/terminology-and-classifications/dm-d>)

NHS Terminology / Ontology Services

Renalware supports on-demand lookup of SNOMED CT concepts, including clinical problems and procedures, using NHS terminology services.

NHS Organisation Data Service

Renalware supports scheduled synchronisation with ODS data, helping keep GP and practice records current.

Identity and Authentication

Renalware can integrate with external identity providers where required, including Microsoft Entra ID/OIDC and LDAP-based directory services, subject to local Trust configuration.

CUSTOMISATION

Renalware includes a number of controlled customisation points that allow local teams to adapt reporting and operational views without changing the core application code.

Custom Reports And Widgets

Authorised superusers can define PostgreSQL views and expose them through the Renalware Reports section for clinical, operational or administrative users. These reports can support local service requirements such as audit lists, pathway monitoring, capacity planning, research extracts or specialist calculations such as urea kinetic modelling.

Reports can be configured with user-friendly titles, columns and filters so that clinical users can access the results through the application rather than needing direct database access.

Renalware also supports SQL-backed widgets that can be surfaced in selected areas of the application. This allows renal administrators or local informatics teams to augment built-in dashboards and patient views with site-specific tables or summaries.

Data Access and Local Analysis

For teams with appropriate governance, database permissions and knowledge of the Renalware schema, PostgreSQL can also be used directly for broader clinical, research, operational or financial analysis.

Queries and extracts can be run manually or scheduled to support daily, weekly or monthly reporting processes. Output can be analysed further using local Trust tools such as spreadsheets, BI platforms, mapping tools or charting applications.

Access to this level of data should be controlled through normal Trust information governance, role-based permissions and database security processes.

Local Configuration

Many Renalware behaviours are configuration-driven, allowing site-specific settings for identifiers, terminology, integrations, letter workflows, reporting and scheduled jobs to be adjusted during implementation.

RENALWARE DEPLOYMENT TO AZURE

We strongly recommend that Renalware be deployed to Microsoft Azure instead of being hosted locally (on-site), although the latter approach is of course possible. Please see the diagram on the following page which illustrates the main components of a sample Renalware/Azure implementation.

Should you need more information, our developers are happy to discuss technical and environmental requirements of the Renalware deployment. We recognise that each potential Renalware installation is unique and there may be special local considerations to take into account.

Example Renalware Architecture on Azure

High-level diagram

