BASHH/FSRH Consensus Statement: Requirements for an effective Electronic Health Record (EHR) for Integrated Sexual Health

The increasing digitisation of healthcare has led to the adoption of Electronic Health Records (EHRs) in the vast majority of UK Integrated Sexual Health (ISH) services. Despite the widespread use of EHRs, collaboration between clinical services in sharing ideas that can drive EHR product development has been limited to date. Recognising the negative impact of this siloed approach, a network of interested clinicians, managers and analysts formed the BASHH/FSRH Integrated Sexual Health EPR Working Group in 2020, with the aim of establishing national priorities for service-led EHR development. The need to develop a national benchmark for ISH EHR provision was recognised, as well as the need to identify and highlight cutting-edge developments that would benefit existing EHR systems if adopted.

In response to these needs members of the working group, with input from key clinical stakeholders, has developed the following document which has two primary objectives:

1. To inform EHR providers what clinical services require from their systems to support effective, efficient and safe ISH services

2. To provide a benchmark against which ISH services can assess incumbent and potential EHR providers, during market engagement and tendering processes

These requirements represent the distilled view of what users within UK ISH services require from their EHR system. These users may be patients, clinicians, analysts, administrators and/or other individuals, whose wellbeing and professional performance depends on the EHR systems used in our clinics. This document will be iterated over time according to developments in the evidence base and user feedback, and will be informed by data collated from a national EHR user survey, the first of which has recently been completed. The EPR Working Group will continue to run this survey every 2-3 years.

To provide comments on this statement please utilise comments and track changes; when finished email your edited document back to Dr J Shaw at the address supplied below. All comments will be collated for discussion with the EPR Working Group to inform the next iteration of this statement.

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1. Data of Subjective Origin (DoSO) domains

We define two major classes of patient data, the first of which is Data of Subjective Origin (DoSO).

DoSO tend to be qualitative, interpreted in some way (either by the patient or clinician) and contribute to the patient narrative history. These data are typically entered into the EHR by users (e.g., presenting complaint, patient history, past medical history, social history, examination findings, management plans, and so on).

Below is guidance on the specific DoSO domains that need to be supported by an integrated Sexual Health (ISH) EHR.

1.1 STI history

- Data fields - see BASHH guidance *2019 UK National Guideline for consultations requiring sexual history taking: Clinical Effectiveness Group British Association for Sexual Health and HIV* https://www.bashhguidelines.org/media/1241/sh-guidelines-2019-ijsa.pdf
- Further data fields for clinical reviews with gay and bisexual men and other men who have sex with men (GBMSM): see BASHH guidance *2016 United Kingdom national guideline on the sexual health care of men who have sex with men* https://www.bashhguidelines.org/media/1162/msm-2016.pdf
- Continuous template to support diagnosis, management and follow up of syphilis – see *UK national guidelines on the management of syphilis 2015:* https://www.bashhguidelines.org/media/1148/uk-syphilis-guidelines-2015.pdf
- Continuous template that supports the assessment for, supportive and ongoing investigations for, results trends over time for, and prescription of HIV Pre-exposure prophylaxis (PrEP) – see *BHIVA/BASHH guidelines on the use of HIV pre-exposure prophylaxis (PrEP) 2018:* https://www.bhiva.org/file/5b729cd592060/2018-PrEP-Guidelines.pdf

1.2 HIV history

- Data fields appropriate for new and follow-up patients living with HIV – see 2019 *BHIVA guidelines for the routine investigation and monitoring of adult HIV-1-positive individuals:* https://www.bhiva.org/file/DqZbRxfzlYtLg/Monitoring-Guidelines.pdf and *part 1 [Assessment] of EACS Guidelines 2020:* https://www.eacsociety.org/media/guidelines-10.1_finaljan2021_1.pdf
- HIV care overview that offers rapid access to a chronological history
- HIV MDT facilitation via a single screen HIV care summary, combined with documentation which updates the patient record with the documented MDT discussion and agreed outcomes

1.3 Contraception and Reproductive Health history

- Data fields - see paper *FSRH Service Standards for Record Keeping in Sexual and Reproductive Healthcare Services 2019*: https://www.fsrh.org/standards-and-guidance/documents/fsrh-service-standards-for-record-keeping-july-2019/
- Continuous template that supports the assessment for and provision of Emergency Contraception, including the provision of a post-coital intrauterine device (PCIUD) if provided – see *FSRH Guideline Emergency Contraception 2020:* https://www.fsrh.org/standards-and-guidance/documents/ceu-clinical-guidance-emergency-contraception-march-2017/
- Continuous template that supports the retrospective review of relevant data fields, subsequent counselling to support contraceptive choices and journey completion via provision

of the selected method - see paper *FSRH Service Standards for Record Keeping in Sexual and Reproductive Healthcare Services 2019*: https://www.fsrh.org/standards-and-guidance/documents/fsrh-service-standards-for-record-keeping-july-2019/

- Continuous template that supports the retrospective review of relevant data fields for an individual LARC method, the counselling of this method, the provision of the method and subsequent follow up visits throughout the compound/device lifetime. – see FSRH guidance on LARC methods: https://www.fsrh.org/standards-and-guidance/fsrh-guidelines-and-statements/method-specific/
- Continuous template that supports the assessment and management of complications of contraceptive methods (e.g., management of abnormal uterine bleeding)
- Continuous template that supports the assessment and retrospective review other aspects of a sexual and reproductive healthcare (SRH) consultation (e.g., preconception counselling, menopause care, cervical cytology)

1.4 Safeguarding history

- Data fields – see clinical assessment in *BASHH National Guideline on the Management of Sexually Transmitted Infections and Related Conditions in Children and Young People (2021):* https://www.bashhguidelines.org/media/1294/children-and-yp-2021.pdf
- Approved evidence-based safeguarding assessment tool – e.g., *Spotting the signs (2014): https://www.bashh.org/documents/Spotting-the-signs-A%20national%20proforma%20Apr2014.pdf*
- Continuously updatable safeguarding assessment tool that supports adaptive safeguarding processes according to reported risks
- Prompted safeguarding needs according to defined criteria (e.g., aged <16, alert of known vulnerability, multiple attendances)
- Template section to support clinical assessment of competency according to Fraser Guidelines [when relevant]
- Demonstrate a clear audit trail of when a safeguarding record has been compiled, edited, or deleted
- The ability to document consent by next of kin / power of attorney
- Incorporate or provide links to local safeguarding pathways
- Clear documentation of MDT signposting, referral, meetings and outcomes

1.5 Partner Notification history

- An integrated partner notification (PN) suite compliant with the requirements of *The SSHA Manual for Sexual Health Advisers 2004*: https://ssha.info/resources/manual-for-sexual-health-advisers/
- The function to produce physical and digital contact slips
- Searching for reported partners must include a wide number of search fields, including initials, nicknames, name fragments and physical descriptors
- Ensure PN information entered for contacts is not stored within the clinical records of the index patient
- Clearly indicate when information presented on screen is from a third party and should not be shared with the source patient being reviewed
- The function (ideally one-click) to move back and forth between index and contacts records
- Quick, read-only view of a second patient whilst continuing to review an index patient's record
- PN processes must create an audit trail that documents updates and changes made as they occur. This audit trail must have the function to be interrogated

- Summary numerical counts within patient record for key metrics – total partners, total contactable partners, total contacted and total verified
- The ability to visualise contacts as a visual network map with relevant information including demographics, exposure details, communication log, notification status, treatment status and other notes
- Capture and calculation for appropriate reports consistent with the requirements of BASHH PN auditable outcomes, including success rates specific to patient cohorts and/or individual diagnoses
- Facilitate documentation of complex Health Advisor work, as defined in recent draft criteria from the Society of Sexual Health Advisors (SSHA)

2. Data of Objective Origin (DoOO) domains

The other major class of patient data we define is **Data of Objective Origin (DoOO).**

DoOO tend to be quantitative or intrinsically objective (e.g., test results, vaccinations, prescribing and radiology), and not descriptive or narrative.

Below is guidance on the specific DoOO domains that need to be supported by an ISH EHR.

2.1 Laboratory tests

2.1.1 Test requesting

- Interoperability with multiple laboratories integrated within a single EHR, either directly or via integration with third-party
- Communication of full granular detail in messaging between EHR and laboratories
- Availability of order sets for common patient scenarios (e.g., T2, T4, T4TT, PrEP, PEP, HIV baseline, HIV routine)
- Printing labels with barcode and clinical details to local printers in clinical rooms
- Ability to scan barcode of samples physically leaving clinic and being received by laboratory (transport audit)
- Ability to document and manage requests [including request forms] for cervical smear testing

2.1.2 Results management

- Display status of tests that are: requested, received in lab, pending processing and completed, in real time
- Automated service-defined NORMAL results processes (e.g., automated normal result SMS and/or Personal Health Record (PHR) notifications
- Automated service-defined ABNORMAL results processes (e.g., automated abnormal SMS, abnormal results task lists according to generic roles (e.g., health advisor, doctor, nurse) and also for specific clinicians, configurable by service)
- Appropriate automated management of mixed results within a test set
- Allow results to be allocated 'for review'
- A service/user-defined results viewer to assess filtered results:
    - overview on a single screen
    - appropriate use of timelines or other appropriate representation
    - appropriate use of visual techniques (e.g., data grouping, aggregation and transformation, colour, tool tips)
- Ability to reconcile tests requested with returned results, identifying and flagging any missing or delayed test results
- Laboratory requests to be made under hospital number or clinic number, with an opt-out option to protect confidentiality (results received into single patient record)
- STI laboratory results overview to include: point-of-care tests (urine dip, pregnancy test, microscopy, TV Ag), general microbiology, STI-specific tests (CT, LGV, GC, MGen), ulcer-specific tests (HSV, syphilis, MPV), Blood-borne infections (HIV, STS, HAV, HBV, HCV)
- HIV laboratory results to include: urine chemistry, FBC, U&E, eGFR, LFT, bone studies, clotting studies, haematinics, HIV viral load, CD4 cell count
- SRH laboratory results to include: FSH, LH, Androgens, Oestradiol, Prolactin, Thyroid Function, thrombophilia screen, coagulation profile, serum ferritin

2.2 Vaccinations

2.2.1 For Hepatitis A virus (HAV) vaccine, the ability to:

- View vaccination status:
  - Naturally immune
  - Immune by vaccine
  - Vaccination in progress
  - Not known
  - Vaccine declined
  - Previous adverse reaction
  - Other
- View relevant test results on the same screen:
  - Blood borne infection serology (HAV, HBV, HCV, HIV, STS)
- Order a course of vaccinations according to a pre-set schedule as well as individual doses
- View, edit and record all doses administered by date, brand, dose and vaccinator (including elsewhere)
- View all future intended doses by date against the intended schedule
- Alert for missed scheduled doses

2.2.2 For Hepatitis B virus (HBV) vaccine, the ability to:

- View, edit and record HBV risk status:
  - GBMSM
  - Sex Worker
  - Geographical risk
  - Sexual assault
  - IVDU
  - HCV infection
  - Other
  - Not known
- View, edit and record HBV vaccination status:
  - Naturally immune
  - Fully immune by vaccine
  - Partially immune by vaccine
  - Non-responder to previous vaccine
  - Vaccination in progress
  - Not known
  - Vaccine declined
  - Previous adverse reaction
  - Other
- View relevant test results on the same screen:
  - Blood borne infection serology (HAV, HBV, HCV, HIV, STS)
  - LFTs
- Order a course of vaccinations according to a pre-set schedule as well as individual doses
- View, edit and record all doses administered by date, brand, dose and vaccinator (including elsewhere)
- View all future intended doses by date against the intended schedule
- Alert for missed scheduled doses

2.2.3 For Human Papilloma Virus (HPV) vaccine, the ability to:

- View, edit and record HPV risk status
- View, edit and record HPV vaccination status:
    - Never received vaccine
    - Partially vaccinated
    - Fully vaccinated
    - Vaccination in progress
    - Not known
    - Vaccine declined
    - Previous adverse reaction
    - Other
- Order a course of vaccinations according to a pre-set schedule as well as individual doses
- View, edit and record all doses administered by date, brand, dose and vaccinator (including elsewhere)
- View all future intended doses by date against the intended schedule
- Alert for missed scheduled doses

2.2.4 For Smallpox vaccine, the ability to:

- View, edit and record MPox virus (MPV) risk status:
    - GBMSM
    - Contact of infection
    - Worker in sex on premises venue
    - Health Care Worker
    - Other
- View, edit and record Smallpox vaccination status:
    - Naturally immune
    - Fully immune by vaccination
    - Partially immune by vaccination
    - Vaccine declined
    - Previous adverse reaction
    - Other
- View relevant test results on the same screen:
    - Blood borne infection serology (HAV, HBV, HCV, HIV, STS)
    - MPV blood and swab results
- Order a course of vaccinations according to a pre-set schedule as well as individual doses
- View, edit and record all doses administered by date, brand, dose and vaccinator (including elsewhere)
- View all future intended doses by date against the intended schedule
- Alert for missed scheduled doses

2.2.5 For the following vaccines, which could be administered elsewhere:

- Influenza vaccine
- Coronavirus vaccine
- Pneumococcal vaccine (PCV-13)
- Pneumococcal vaccine (PPV-23)
- Other

The ability to:

- View, edit and record all doses administered by date, brand, dose and vaccinator (including elsewhere)
- View all future intended doses by date against the intended schedule

- Alert for missed scheduled doses

2.3 Prescribing

- An electronic prescribing suite compliant with BNF recommendations for computer-issued prescriptions: https://bnf.nice.org.uk/medicines-guidance/prescription-writing/ and *FSRH Service Standards for Record Keeping in Sexual and Reproductive Healthcare Services 2019*: https://www.fsrh.org/standards-and-guidance/documents/fsrh-service-standards-for-record-keeping-july-2019/
- System clearly documents the creator of prescriptions and provides an audit trail for any amendments to that prescription
- Distinction between prescribing, provision of medication by PGD and in-clinic administration
- Record and view reasons treatments were commenced and reasons they were discontinued
- Record and review batch numbers, expiry dates and clinical notes when administering injectable therapy
- Record and review device type, batch numbers, expiry dates and clinical notes when fitting an intrauterine device or contraceptive implant
- Electronic formulary is customisable by the service (e.g., to add in newly available treatments, remove those withdrawn from circulation, update treatment coding in line with national surveillance system recommendations)
- Overview of prior prescribed medicines
- Track how medications are supplied to patients (e.g., handed over, collected or posted)
- Automated audit trail for all medications supplied by post
- An updatable list of known drug allergies, including details of severity and date of occurrence, ensuring this information is prominently displayed to users at all times
- Automatic alert of prescribed medications for known allergies
- Automatic alert when prescribing medicines subject to MHRA alerts (eg. quinolones)
- Automatic assessment alert of co-prescribed medications for known drug interactions
- Ability to integrate with the NHS Summary Care Record to view allergies and concomitant medications or similar
- Prescribing information automatically populates national reporting information (e.g., HARS)

2.4 Radiology

- Radiology image hosting and viewing likely to remain outside of sexual health EHR
- EHR system able to import and store radiology images and reports, including bedside ultrasound, with a filter function to identify and access them with the patient dataset
- Continuous template that supports the documentation of bedside ultrasound, including transvaginal, abdominal and musculoskeletal assessments

2.5 Patient photographs

- The ability to store clinical photographs of patients securely, when taken by a clinician
- The ability to store clinical photographs of patients securely, when taken by a patient

2.6 Files

- Secure uploading of documents, email and message chains, and scanned documents
- Ability to read documents, email and message chains, and scanned documents in web browser
- Ability to download documents, email and message chains, and scanned documents

3. Clinical Usability

Our concept of clinical usability is based on the 1998 ISO/IEC Standard 9241-11 definition of usability: '*the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use*'. 'Specified users' are the clinicians and clinical administrators who use the EHR, and the 'specified context of use' is ISH clinical practice.

Engagement with the clinician community has highlighted the following four key themes that, if implemented appropriately, will contribute to improved clinical usability. It is intended that these themes can be applied across all DoSO and DoOO domains, in a manner that is specific and appropriate to each domain.

3.1 Overview of data

3.1.1 General overview

General overview offers situational awareness of the clinical data landscape, and also a point of reference to support specific tasks such as exploration, navigation, understanding, planning and monitoring of patient data. Requirements apply to individual patient data and also cohort patient data, detailed below where appropriate.

- High-level, visually 'efficient' overview(s), ideally on a single screen
- Appropriate representation of continuous or episodic events over time, using timelines or other techniques such as tables (e.g., for vaccines, a visual timeline of date administered and dose, as well future scheduled dose and missed doses)
- Appropriate representation of past events that remain clinically salient moving forward, regardless of their occurrence over time (e.g., allergies, significant clinical events, significant safeguarding situations)
- Appropriate visibility representation of salient cohort patient data with respect to time (data that may have occurred at a point in time but remain clinically relevant moving forward, such as dates of diagnosis, dates or contraceptive procedures, key results
- Pre-set or user-selectable overview(s) that support the following date views:
    - data across all dates
    - data across a range of dates
    - data from a single date
- Pre-set or user-selectable overview(s), commonly called dashboards, that support the following:
    - collating and presenting results data within a single patient record to support retrospective clinical review (e.g., STI and HIV results dashboard)
    - collating and presenting of clinical data fields from multiple templates within a single patient record into a single summary view (e.g., summary contraception history when reviewing contraceptive choices, HIV MDT proformas)
    - viewing data fields collated from multiple patient records on a single screen (e.g., supporting PN by viewing multiple reported contacts concurrently)
    - easy review of previous communication within a single patient record (whether face-to-face, telephone, online or web-based)
    - viewing data fields collated from multiple patient records on a single screen
    - easy review of previous communication within a patient cohort (whether face-to-face, telephone, online or web-based)

3.1.2 Navigation of data silos

- Where overview is not provided or required, the user must be able simultaneously to access data from different sources (e.g., DoSO domains, DoOO domains, appointment details, patient demographics, diagnosis and service provision codes, guidelines). In other words, un-navigable data silos must be avoided

3.2 Reasoning with data

Clinical reasoning is the principal process by which clinicians make sense of patient data. An EHR interface can support this process by representing data in a way that demonstrates clinical relevance and salience. This can be achieved by considering data mapping, visual mapping and user interaction (Card, S.; Mackinlay, J. & Shneiderman, B., ed. (1999), *Readings in Information Visualization: Using Vision to Think* , Morgan Kaufmann , California, USA).

3.2.1 Data mapping

- Appropriate representation of data type and value, using data type transformation and data value derivation for certain views (e.g., a quantitative result within normal reference ranges might be more succinctly represented nominally as 'normal')
- Appropriate representation of data fields, using data field rules if appropriate for certain views (e.g., multiple test components might be represented as a single aggregated set)

3.2.2 Visual mapping

- Appropriate use of the x- and y- planes of the spatial substrate (i.e., the use of timelines or visualisations that reflect clinical workflow, the appropriate level of data density) and additional techniques such as alignment, folding, recursion and overloading (e.g., grouping of related data in the design of bespoke layouts for DoOO domains)
- Appropriate use of connection and enclosure (e.g., connecting an abnormal test result with its subsequent treatment)
- Appropriate use of the retinal variables: shape, colour, texture, position, size and orientation (e.g., red to denote 'abnormal', or the use of glyphs to visualise common tests)

3.2.3 Interactivity

- Appropriate use of user-controlled interaction techniques, for example as described by Shneiderman in the 'Information seeking mantra': *overview first, zoom and filter, then details-on-demand* - through hyperlinks, on-screen controls, filters, hover-over, tool tips and panels

3.3 Input of data

3.3.1 DoSO templates

- DoSO input should be in the format of user-defined, structured templates as well as modular DoSO components
- DoSO data fields should be appropriate to clinical need (see Section 1, 'DoSO domains')
- DoSO templates (or components) should provide options for documentation in appropriate format(s) (e.g., free text, date field, drop down, multi-select, radio button etc.)

- DoSO templates should provide functionality to support flagging of key data items for future reviews (e.g., drug allergies, safeguarding concerns, behaviour alerts, translator requirements)
- DoSO templates (or components) should be able to be added mid-consultation (e.g., patient attends for an STI screen but also needs emergency contraception)
- DoSO templates (or components) should be as an automated response in appropriate clinical scenarios (e.g., age<18, safeguarding or gender (contraception/menstrual history)
- The automated availability of patient information resources in response to clinical diagnoses as they are documented (e.g., specific health advice following a clinical diagnosis of herpes)
- DoSO templates should offer the visual documentation of clinical examination findings by annotatable anatomical diagrams
- The EHR vendor should support bespoke DoSO template design, with rapid deployment to clinical services
- Users with appropriate system rights should be able to create, edit and configure DoSO templates (or components) via an intuitive, user-friendly interface
- The EHR vendor should maintain an up-to-date repository of example DoSO templates (or components) in use by other clinical services that are freely available for testing and adoption / adaptation by other services
- The EHR vendor should hold regular user-group meetings/events to discuss and iterate the design of commonly used DoSO templates (or components)

3.3.2 Simultaneous data entry and review

- Data entry must be possible ***at the same time*** as review of clinical data (DoSO and DoOO)
- Pull-through of previous DoSO during data entry (only where appropriate), without having to leave the current window, with the option to confirm, update or replace:
  - from previous (historical) consultations (i.e., minimise repeat questioning from previous visits)
  - from the current (same day) consultation (i.e., minimise repeat questioning from the same clinic visit)
  - pull-through should continue to flag key data items from prior reviews (e.g., drug allergies, identified safeguarding concerns, translator required)

3.4 Clinical digital affordances

Clinical digital affordances exploit the characteristics of the digital medium specifically to support clinical practice. They are distinct from generic digital affordances, which are discussed in section 7.4, 'General Usability'.

3.4.1 Embedded links

- Automated or user-selectable, to the following features when appropriate:
  - relevant clinical guidelines (e.g., UKMEC, BASHH and BHIVA guidelines)
  - risk score calculators with alerts (e.g., QRisk, FRAX, BMI)
  - patient information resources (to printer or by shareable link)
  - patient communication (SMS, PHR)
  - scheduling for future services required (e.g., vaccinations, contraception expiry, repeat prescriptions, physical, cognitive and mental health assessments)

3.4.2 Automated prompts and alerts

- Automated setting of prompts, at appropriate intervals, for future services required (e.g., vaccination schedules, expiry dates, follow-up dates, physical, cognitive and mental health assessments, with appropriate responses according to patient's reported condition or symptoms
- Fully/partially automated calculation of risk scores utilising key data items available within the clinical record

3.4.3 Automated coding for diagnosis and service provision

- Automated coding from clinical record entries, including test requesting (e.g., Herpes testing auto-codes as T5/relevant SNOMED code), provision or review of a contraceptive method (e.g., implant insertion applies relevant SRHAD code) and prescribing information (e.g., PrEP autocodes such as O31, O41, O53 / relevant SNOMED codes etc.)

3.4.4 A list of recently-accessed patient records

- A list of recently-accessed patient records for each user, to enable review of patients recently seen

3.4.5 Artificial and Augmented Intelligence

- The use of Artificial Intelligence (AI) or Augmented Intelligence, where appropriate, to support clinical practice (e.g., diagnostic algorithms, clinical queries, finding relevant research evidence, **transcription of dictated case notes, organisation of images and files,** patient support and communication)

4. Collaboration between Clinic Staff

Note: 'in-clinic' includes virtual clinics (telephone, video consultations etc.)

4.1 Situational awareness of patients currently 'in clinic'

- Reception staff able to record easily visible triage information when booking in patients
- Service-defined reminder system to prompt staff to check and update demographic information e.g., address details, gender identity, particularly if information is absent from the record
- Real-time waiting room showing patient appointment details, triage information, arrival and derived wait time, and appointment notes (e.g., patient has left department to put more money on the car)
- Electronic check-in for appointments via dedicated kiosks
- Electronic check-in via patients' personal devices (e.g., smartphone)
- Track/locate patients within the service via information from the EHR
- Track/locate clinicians within the service via information from the EHR
- Flag or set a patient alert/reminder visible to all staff when the record is opened in clinic
- Flag or set a patient alert/reminder only visible to restricted users/user groups when the record is opened in clinic

4.2 Collaborative care of patients currently 'in clinic'

- Support rapid change logout / login between users on a single workstation (e.g., to document second opinions or facilitate the handover of complex patients)
- Multiple clinicians able to open/view a clinical record at the same, with overwrite protections applied to individual clinical template data fields (i.e., ensuring two active users cannot edit a single template field concurrently)
- Send confidential messages within the EHR to other active users
- A real-time message board to enable active users to receive asynchronous handover of key events in clinic that day

4.3 Collaborative care of patients not necessarily 'in clinic'

- The ability to set time-defined recalls to prompt clinical review (e.g., write next prescription in 5 months' time, vaccination due dates)
- System supports the generation of bespoke task lists – these task lists can be generated automatically from recalls, but also can be created and edited by system users
- The ability for task lists to be collaborative between multiple concurrent system users
- The ability for individual users to maintain their own personal patient lists (e.g., recent, patients of interest, patients requiring follow up, patients whose results need reviewing
- Enter patient messages (emails and SMS) to be sent at a later specified date
- Automatic generation of a pattern of service-defined recalls at defined frequencies (e.g., at 3, 6 and 12 months when a syphilis diagnosis code is applied)
- The ability to generate referral letters for onward referrals outside the ISH service

5. Appointments

5.1 Patient identity

- Automated generation of service-defined patient ID numbers/codes at time of demographics entry
- Ability to record patient NHS numbers, as well as ability for patients to opt-out of documenting their NHS number
- Automated generation and attachment of correct soundex codes to patient records at time of new patient record creation
- Inclusive gender options available for patient demographics, including trans and non-binary – *see BASHH recommendations for integrated sexual health services for trans, including non-binary, people 2019*: https://www.bashh.org/media/4400/bashh-recommendations-for-integrated-sexual-health-services-for-trans-including-non-binary-people-2019pdf.pdf

5.2 Appointment creation

- Available appointments should be easily identifiable by date, time, clinical service(s) required, consultation modality (e.g. face-2-face, video, telephone, other), clinician and appointment length – both by search and diary view
- The booking should record the source of the referral and reasons for attendance
- Future appointments booked should be visible whilst the booking process for a new appointment is ongoing
- Flag certain patient characteristics which are visible to all users e.g., communication difficulties, previous patient aggression, under-18s

5.3 Appointment management

- Print customisable patient details labels e.g., Name, DOB, patient number
- Capture of cancellation data including who cancelled the appointment and reasons for cancellation
- Capture and report DNA rates
- Provide service-defined automated DNA strategies (e.g., DNAs automatically applied if >30 mins since appointment time, automated SMS sent to inform patient of next steps following DNA)

5.4 Appointment error and data duplication safeguards

- Ability to merge duplicate patient records, with in-built error checking
- Patient numbers must not be duplicated, even if the number has been previously merged or deleted
- Allow for potential implementation of a new/updated patient numbering system, with a legacy link to prior patient numbers used in the service
- Link to national GP database to ensure accuracy of GP details in the patient record, including the function for no allocated GP or pooled lists; also to include capture of GP contact email addresses
- Record, flag and share patients', service users', carers' and parents' information and communication needs in keeping with the NHS accessibility information standards

https://www.england.nhs.uk/wp-content/uploads/2017/08/accessilbe-info-specification-v1-1.pdf]

6. Communication with Patients

6.1 General principles

- Confidential storage of patients' contact details:
  - Postal address[es]
  - Telephone number[s]
  - Email address[es]
- Ability to clearly denote and as a result restrict communication via these routes according to patient preference
- Automated blocking of process when system users attempt to use a method of communication that has been declined by a patient e.g. email generation blocked when staff attempt to use email within a record of a patient who has declined email contact
- Fully incorporated postcode lookup system, with auto-completed address details, which is regularly updated

6.2 SMS

- Integrated 2-way SMS communication
- Patient SMS reminder functionality to include date, time, modality, location (if relevant) and option to reply to cancel / reschedule
- Ability to generate automated messaging based on service-defined parameters (e.g., automated SMS for negative results)

6.3 Letter and email

- Integrated clinical letter writing, editing and printing
- Supports voice recognition software for letter writing
- Integrated email writing, editing and sending
- Integrated PHR message writing, editing and sending
- Auto-completion of clinical and administrative information sections within patient communications (e.g., results, prescriptions. plan, GP details, referral details)
- The generation and subsequent use of standard letter templates

6.4 Online

6.4.1 Online booking

- Intuitive online booking process with seamless integration into service websites and online triage, test kit, contraception and condom provision
- Checking process within the online booking system to assess for existing clinical records on the EHR, including highlighting records with similar details
- Clinic ID assigned to patient at the point of booking, with identification of existing clinic ID to avoid duplication
  - Once assigned the booking system can inform patient of this ID - via direct display, SMS and/or PHR
- Clinical triage within the online booking process, to define the service need and therefore appointment type
- Adaptive booking process and displayed information according to patient characteristics (e.g., ability to change page language, easy-read option)
- Adaptive appointment duration appropriate to service needs (i.e., if contraception and sexual health needs identified then a longer appointment is booked)

- Adaptive appointment type appropriate to service needs (i.e., if contraception and sexual health needs identified then the patient is assigned to a clinic with a dual-trained professional)
- Adaptive appointment requirements according to special requirements (i.e., if an interpreter is requested a longer appointment is booked)
- Booking process permits patients to choose their preferred clinic location(s) and/or consultation modality for review
- Patients can amend, cancel or add clinical detail to bookings made online - via PHR and/or SMS technologies
- Patients can amend, cancel or add clinical detail to bookings made over the telephone - via PHR and/or SMS technologies
- Patients can amend, cancel or add clinical detail to follow-up appointments booked at a prior clinic visit - via PHR and/or SMS technologies
- System populates EHR, including clinical templates, with information completed during online triage
- Online booking process meets current UK public sector accessibility regulations

Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018,

https://www.gov.uk/guidance/accessibility-requirements-for-public-sector-websites-and-apps

https://www.gov.uk/guidance/make-your-website-or-app-accessible-and-publish-an-accessibility-statement

- Web Content Accessibility Guidelines (WCAG) 2.1 level AA compliant]

6.4.2 Online services

- Patients self-triage for clinical needs
- Patients able to self-assess for contraceptive contraindications, with this information linked to their EHR record
- Patients able to request postal STI testing
- Patients able to request and receive oral and barrier contraception methods via a flexible and service-defined history taking and management algorithm
- Incorporation of integrated, or API integration with external provision of, video consultation functionality
- Incorporation of integrated, or API integration with external provision of, webchat functionality

6.4.3 Personal Health Record (PHR)

- Easily accessible web-based portal (personal health record – PHR) for patients which communicates in real time with the EHR, either via direct provision and/or by facilitating secure data exchange with a third-party provider (e.g., Patient Knows Best
- PHR enables patients to amend demographics and make/change/cancel appointments
- PHR enables patients to review and share (should they choose) previous investigation results
- PHR enables patients to present key treatment dates e.g., LARC fit dates, syphilis treatment dates, ART initiation and switch dates via this patient portal (service-defined)
- PHR enables patients to complete a clinical history online which imports to draft clinical templates ready for an upcoming clinical review
- PHR enables patients to securely upload images
- PHR enables patient-led Partner Notification with real-time updating of the EHR documentation
- PHR includes patient messaging system, to individual or groups of clinic staff

- Patient portal to meet current UK public sector accessibility regulations

Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018,

https://www.gov.uk/guidance/accessibility-requirements-for-public-sector-websites-and-apps

https://www.gov.uk/guidance/make-your-website-or-app-accessible-and-publish-an-accessibility-statement

- Web Content Accessibility Guidelines (WCAG) 2.1 level AA compliant]
- A person-centred approach must be taken to all patient-accessible areas of the platform; wherever possible (via clinics or national bodies) including patient-users in the co-design and review of these components of the platform
- A user interface which adapts to the user's device e.g., appropriate desktop / smartphone / tablet screen size and functionality adaptations
- Portal to adapt according to patient characteristics e.g., ability to change page language, easy-read option
- Robust security complaint with NHS Digital standards
- Robust two-factor authentication for access to patient portal

7. General Interface Requirements

7.1 Digital Technology Assessment

- System platform meets the Digital Technology Assessment Criteria for health and social care (DTAC [https://www.nhsx.nhs.uk/key-tools-and-info/digital-technology-assessment-criteria-dtac/])
- System speed must not be affected by the number of active users
- Fast load times between sections of the EHR: ≤2 seconds for all functions including moving between system views, opening patient records, and opening clinical templates

7.2 System availability

- Web-based program – able to run on all commonly used browsers.
- Able to run a variety of devices - desktop, laptop, smartphone, tablet

7.3 Accessibility

- Meet accessibility criteria within digital technology assessment criteria (DTAC)
- Minimal use of colours taking colour vision deficiency into account
- Adaptive font size / screen resolution to allow for users with poor sight, without loss of key information outside of the borders of the monitor/screen
- System to support a high contrast mode
- Voice activation

7.4 General Usability

7.4.1 Ergonomics of user interface

- EHR development teams should include team members with experience of, and/or seek external review for, iterative design of the ergonomics of the user interface
- Display settings to allow the user interface to adapt to variable screen diameters
- Screen sections should be variable adjustable to suit the users' preferences
- Use of background/font sizes/colours to distinguish clearly between template and clinical data
- Clear visual indication of mandatory fields on screen
- Clear identification of "copy previous" contents using a specified colour or font characteristic
- Free text fields in clinical templates to expand to fit the amount of text being entered.
- Patient demographics to be clearly visible on every screen in a header
- Standard exit/save/edit button functionality and location on all screens
- Tab/Menu/Relevant data button text to go bold or change colour to indicate when underlying data exists
- Maximum functionality on a single screen (taking into account number of items, sizes, visual clarity, screen resolution) to minimise moves between multiple screens/sections and mouse clicks

7.4.2 Keyboard and mouse functionality

- Both keyboard shortcuts and mouse right-click functionality should be available to cut, copy and paste within the clinical record
- Consistent use of hover/single/double click functionality

- Keyboard shortcuts within the diary and recall setting should be available (e.g., ‘t’ for today; ‘+1w’ for in one week)

7.4.3 System response when inputting clinical data

- User-defined abbreviations that can expand when entered into free text fields, e.g., “M” for male and “F” for female
- Use of ‘canned phrases’ within the clinical record (i.e., pre-set common phrases activated by user-defined abbreviations / acronyms)
- System to support reactive spell-check functionality
- An auto-save function during the completion of clinical templates

7.5 System upgrades

- System upgrades to be applied out-of-hours
- Allow for end-user testing via a testing environment prior to launch and prior to any upgrade or EHR iteration
- System upgrades should be beta-tested with a network of clinical users prior to wider implementation / adoption in the EHR

8. System Administration

8.1 User management

- Service able to add, edit and delete users
- Service administrators can reset passwords and unlock user accounts for staff
- Service administrators can reset passwords and unlock user accounts for patients with PHR accounts
- System supports links with local / trust / provider defined single sign-on solutions
- System supports sign in utilising NHS Smartcard authorisation
- System functionality defined by user groups and individual user profiles
- Ability to control system access according to the physical location of the user
- System Manager should at any time be able to view the activity of any user from a master system administrator interface
- System Manager to be able to access a visible and reportable audit trail of any adding/editing/deleting of users and the frequency of password resets
- System able to print user / role lists to support audit management

9. Data Analysis and Reporting

9.1 Data analysis

- Compliance with essential national reporting systems (e.g., GUMCAD/SRHAD/HARS/CTAD/SWS/NaSH) *– see BASHH standards for the management of STIs 2019:* https://www.bashh.org/about-bashh/publications/standards-for-the-management-of-stis/
- New mandatory data requirement functionality must be available prior to the mandatory upload period to enable testing of data extraction to be carried out
- When installed in English sexual health services, system must be compliant with the most recent iteration of all mandatory reporting systems eg. GUMCAD (currently version 3)
- Quality of coding assured by the use of algorithmic and rules-based validation checks on closure of clinical templates
- Provision for standard HL7 compliant interface through an up-to-date recognised API
- Reporting supported in various appropriate data formats. E.g., CSV, Excel, XML
- Fully support the output of all recognised SNOMED codes
- Standardised terminology and data name formats to be used throughout the record system
- EHR provider should be engaged with the BASHH/FSRH Information Group, keeping up-to-date with planned changes in national clinical coding guidance
- EHR provider must provide a regularly updated and validated data dictionary and database relationship to facilitate offline data manipulation outside of the system
- Locally agreed coding able to be defined and added by the service e.g., for any additional or adaptive reporting requirements
- Quarterly system updates when deployed in English or Welsh sexual health services, with the latest ONS LSOA codes as they are released by ONS

9.2 Data reporting

- System must be compliant and updated in line with required reports for national surveillance strategies
- A user-driven reporting tool with intuitive functionality to support data analysts to write and review new reports in real time
- Supplier must provide clear documentation as to how to use the reporting tool, tables and functionality of the system to support analysts generating bespoke reports
- Generation of reports on diagnosis and activity codes e.g., using SRHAD, GUMCAD, HARS, SWS, NaSH coding
- Fully automated generation of required national surveillance reporting, including upload of reports to relevant national organisations
- An aggregated summary of surveillance data that users can easily understand e.g. presenting the individual numbers of patients (by gender, sex ori, age etc) consultations, tests, diagnosis etc so users can easily assess whether surveillance data are accurate before submitting
- Integrated service-defined data quality checking processes
- Collated reporting for individual patient episodes i.e. system delineates episodes of care and collates all relevant coding within that reported episode
- Automatic generation of reports on attendance, including tracking this data over time. This includes DNA rates, time to next available appointment etc.
- System provider must work with and provide the ability to generate reports for agreed tariff pathways e.g. pathway analytics.
- Support easy delineation of clinical activity that is charged outside an agreed core sexual health contract e.g., HIV outpatient activity, cervical smears, psychological therapy

9.3 An auditable trail

- A full audit trail including tracked changes by date, user and user location

10. Data Governance

10.1 Data import / export

- Full import and integration of data/results from postal testing providers
- Export of clinical documentation for medicolegal requests, producing documentation in an appropriate format
- Facilitate data migration from an existing or previous EHR provider, including the ability to search by legacy identifiers from that database

10.2 Data management

- Compliance with FSRH Guidance on Service Standards for Confidentiality in Sexual and Reproductive Health Services 2020: https://www.fsrh.org/standards-and-guidance/documents/fsrh-service-standards-for-confidentiality-in-srh-services/
- Compliance with the Consensus Statement on Confidentiality in Sexual and Reproductive Health and HIV Services – emailed re ref ??in public domain yet
- EHR provider should complete and ensure compliance with the NHS Data Security and Protection Toolkit
- Siloing of data to permit clinical records for some patients to only be reviewed by certain staff groups or staff location

10.3 Data security

- Passwords stored in encrypted form.
- Easy extraction of data for subject access requests.
- Access for remote working at outreach services, and via VPN
- Encryption of patient ID data – provided by a recognised supplier – Microsoft, Amazon Web Services etc.
- User timeout function after a period of non-activity, with the duration to timeout set by the individual service
- Ability to protect inappropriate access by some staff members to patient data or images by use of a “need to know” function

10.4 Data archiving

- Compliance with BASHH Guidance on the Retention and Disposal of Clinical records 2016: https://www.bashh.org/media/2608/bashh-guidance-on-the-retention-and-disposal-of-clinical-records-2016-update.pdf
- Compliant with NHS Records Management Code of Practice: https://transform.england.nhs.uk/information-governance/guidance/records-management-code/records-management-code-of-practice-2021/

11. EHR vendor relationship

11.1 Costs

- Modular structure to EHR, with associated adaptive costing
- Costs to make the EHR compliant with nationally mandated clinical and reporting requirements should not be passed to the clinical service
- Licencing costs should be attributed to either individual or concurrent number of users

11.2 Technical support

- An easily accessible digital and telephone helpdesk
- Prompt turnaround times for service requests - please indicate your average resolution times
- Openly share common service requests / system errors with users, evidencing fixes for these issues and supporting users to access said fixes
- Support services via the co-development of a business continuity plan in case of EHR downtime
- Evidence data recovery and backup processes for clinical data
- Evidence available user training and support packages, both at system set up and on a rolling basis throughout the duration of the agreed supply contract
- Provide support to services via the co-development of an offline plan
- Active collaboration with clinical laboratories, identifying and resolving known issues with lab links

11.3 Future roadmap

- An active development roadmap
- Evidence active engagement with sexual health services to drive EHR development
- Evidence active facilitation of user groups and ideas sharing
- Facilitate engagement (via clinics or via national bodies) with patient user groups and involve them in the co-design of patient-facing services such as a PHR
- Survey for and reduce duplicate working at clinical sites, encouraging networked co-development between services with shared objectives
- Evidence attendances to clinical sites to review their system in use by users
- Maintain a high-quality interactive website to which users can login, containing key issues such as known software problems, incoming upgrades, and dates for fixing common bugs
- Consult and engage with experienced sexual health clinicians and data managers regarding the design and testing of major system changes and upgrades

12. Glossary of Terms

AI	Artificial Intelligence
API	Application Programming Interface
BASHH	British Association for Sexual Health and HIV
BHIVA	British HIV Association
BMI	Body Mass Index
BNF	British National Formulary
CSV	Comma Separated Values
CT	*Chlamydia trachomatis*
CTAD	CTAD Chlamydia Surveillance System
DNA	Did Not Attend
DOB	Date Of Birth
DoOO	Data of Objective Origin
DoSO	Data of Subjective Origin
DTAC	Digital Technology Assessment Criteria
eGFR	estimated Glomerular Filtration Rate
EHR	Electronic Health Record
FBC	Full Blood Count
FRAX	Fracture Risk Assessment Tool (https://frax.shef.ac.uk/FRAX/)
FSH	Follicle Stimulating Hormone
FSRH	Faculty of Sexual and Reproductive Healthcare
GBMSM	Gay and bisexual men and other men who have sex with men
GC	Gonorrhoea
GP	General Practitioner
GUMCAD	GUMCAD STI Surveillance System
HARS	HIV and AIDS Reporting System
HAV	Hepatitis A Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
HSV	Herpes Simplex Virus
ID	Identification
IEC	International Electrotechnical Commission

ISH	Integrated Sexual Health
ISO	International Organization for Standardization
IVDU	Intravenous Drug Use
LARC	Long Acting Reversible Contraception
LFT	Liver Functions Tests
LGV	*Lymphogramuloma venereum*
LH	Luteinising hormone
LSOA	Lower Layer Super Output Area
MDT	Multi Disciplinary Team
MGen	*Mycoplasma genitalium*
MHRA	Medicines and Healthcare products Regulatory Agency
MPV	Mpox Virus
NaSH	National Sexual Health System (Scotland)
NHS	National Health Service (UK)
ONS	Office of National Statistics
PCIUD	Post-Coital Intrauterine Device
PEP	Post Exposure Prophylaxis (for HIV infection)
PGD	Patient Group Directions
PHR	Personal Health Record
PN	Partner Notification
PrEP	Pre Exposure Prophylaxis (for HIV infection)
Qrisk	QRISK cardiovascular risk calculator (https://qrisk.org)
SHRAD	Sexual and Reproductive Health Activity Data Set
SMS	Short Message/Messaging Service
SNOMED	SNOMED CT structured clinical vocabulary for use in electronic health records
SRH	Sexual and Reproductive Health
SSHA	Society of Sexual Health Advisors
STI	Sexually Transmitted Infection
STS	Serological Tests for Syphilis
SWS	Sexual Health in Wales Surveillance Scheme
TVAg	Trichomonas Vaginalis Antigen
U&E	Urea and Electrolytes
UKMEC	UK Medical Eligibility Criteria
WCAG	Web Content Accessibility Guidelines
XML	Extensible Markup Language