Staff Health Surveillance System (S3): Disease Outbreak's One-Stop Staff Repository

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Aim

Multiple standalone IT systems across healthcare institutions were hastily built during SARS for healthcare workers (HCW) surveillance. Over the years, the systems' technology have also become obsolete, resulting in laborious and manual processes to retrieve HCW data, impeding response speed towards disease and nosocomial outbreaks.

To further enhance patient and staff safety, a robust and operationally-compatible national system is needed to replace the existing systems, and serve as a one-stop, centralised HCW records database to facilitate surveillance, detection and response during outbreaks.

The project aims were as follows:
- Plan and validate system requirements and functionalities to build a robust and operationally-compatible Staff Health Surveillance System (S3)
- Build healthcare outbreak management capability to enable timely detection and response

Methodology

Sep 2016 – Dec 2016	Jan 2017 – Sep 2017	Oct 2017 – Mar 2018	Mar 2018 – Jun 2018	Apr 2018 – Ongoing
Information Gathering	**Requirements Gathering & System Development**	**System Testing & Issues Prioritisation**	**System Governance & User Access**	**Data Migration, System Transition & Implementation**
• Define scope of system • Develop questionnaires to understand SingHealth institutions' policies, guidelines and processes for HCW records management • Identify gaps and issues for resolution by relevant policy-making platforms	• Gather and synchronise requirements from SingHealth institutions • Resolve conflicting cluster requirements • Propose system functionalities and specifications for system development by IHIS	• Validate system functionalities, system design and user interface through User Testing • Review and prioritise all system issues for immediate resolution or long-term enhancements	• Conceptualise system governance and user access framework • Conduct user engagement sessions and develop materials to facilitate institutions' user access set-up	• Propose data migration strategy and system transition plans for systems to be replaced by S3 • Develop system implementation plan, including user trainings, user guides, roadshows and presentations to management platforms

Results

S3 was developed as a national system spear-headed by the SingHealth HCW Surveillance Workgroup, completing the various steps outlined in the methodology. The system went technical-live in April 2018 and will transit to operational-live in July 2018, achieving the following project aims:

(1) Robust and Operationally-Compatible S3

**1a. Universal S3 Access by HCW (Fig.1)**
- NRIC/FIN number as staff identifier
- Payroll staff details interfaced and updated daily from SingHealth HRIS
- Inactive payroll staff records are automatically archived
- Plan to explore interfacing non-payroll staff profiles from existing system(s)

1b. Centralised Records Database (Fig.1)
- S3 is a one-stop database for HCW Immunisation, Temperature, Sickness, Travel, Personal Protective Equipment (PPE) and Infection Prevention and Control Training (IPCT) records
- S3 Dashboard:
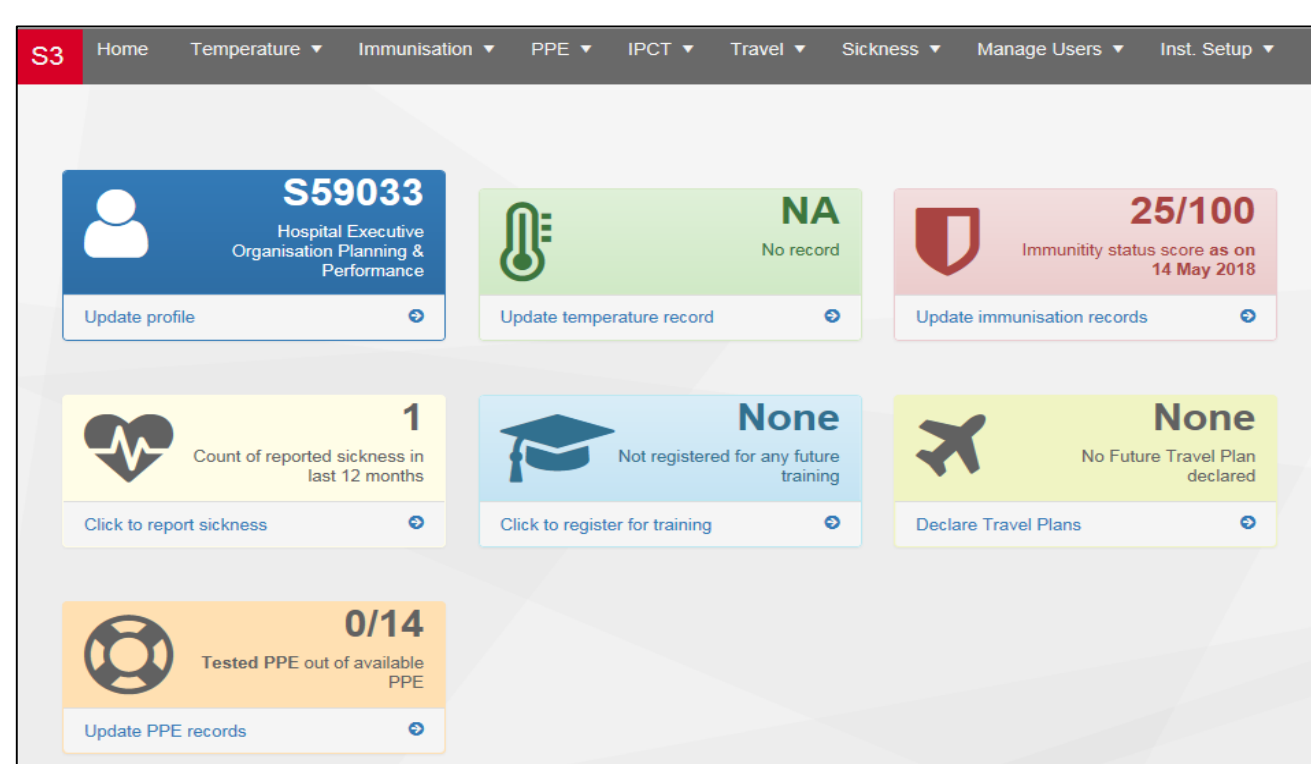
- Plan to explore interfacing records from existing source system(s) for e.g.
  - National Electronic Health Records (NEHR) for Immunisation records
  - Learning Management System (Wizlearn) for IPCT records

Figure 1: Scope of S3's First System Release
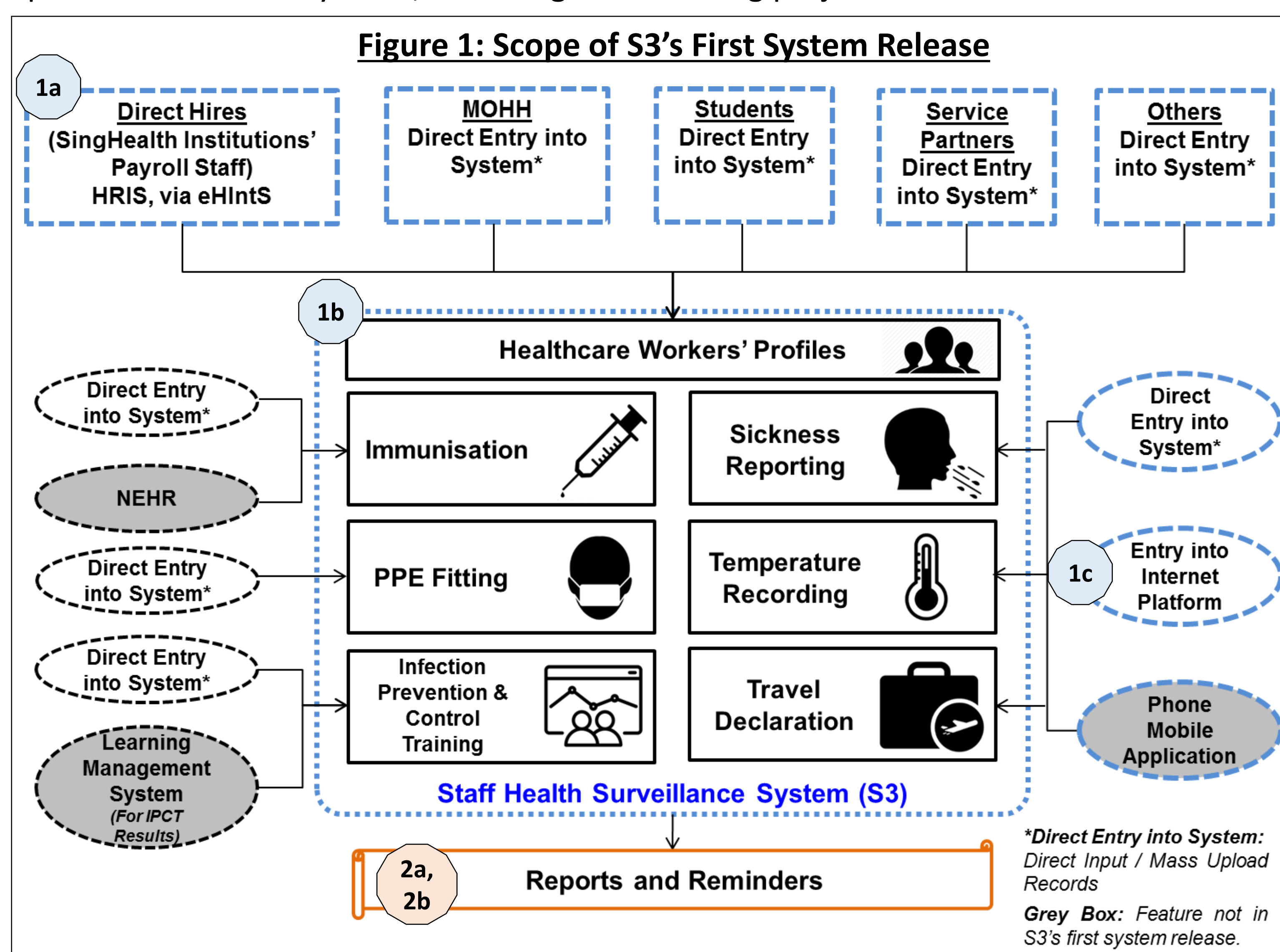
- Records Upload Function and Mass Upload Template:
 - Sample data and colour-coded fields to facilitate input of data in required format

Red – Mandatory fields
Blue – Non-mandatory fields
Yellow – Sample data

1c. Internet & Intranet Platforms (Fig.1)
- Staff can submit Temperature, Sickness & Travel records on-/off-site
- Plan to explore phone mobile application

1d. Flexible User Access Framework
- User roles decentralised at modular level
- Customisable user role combination(s) across modules

(2) Enhanced Healthcare Outbreak Management Capabilities

2a. Reports (Fig.1)
- Wide range of report filters for reports generation from each module
- S3 Immunity Status Report:
  - Pre-configured algorithm of HCW vaccination and serology status to determine disease immunity status
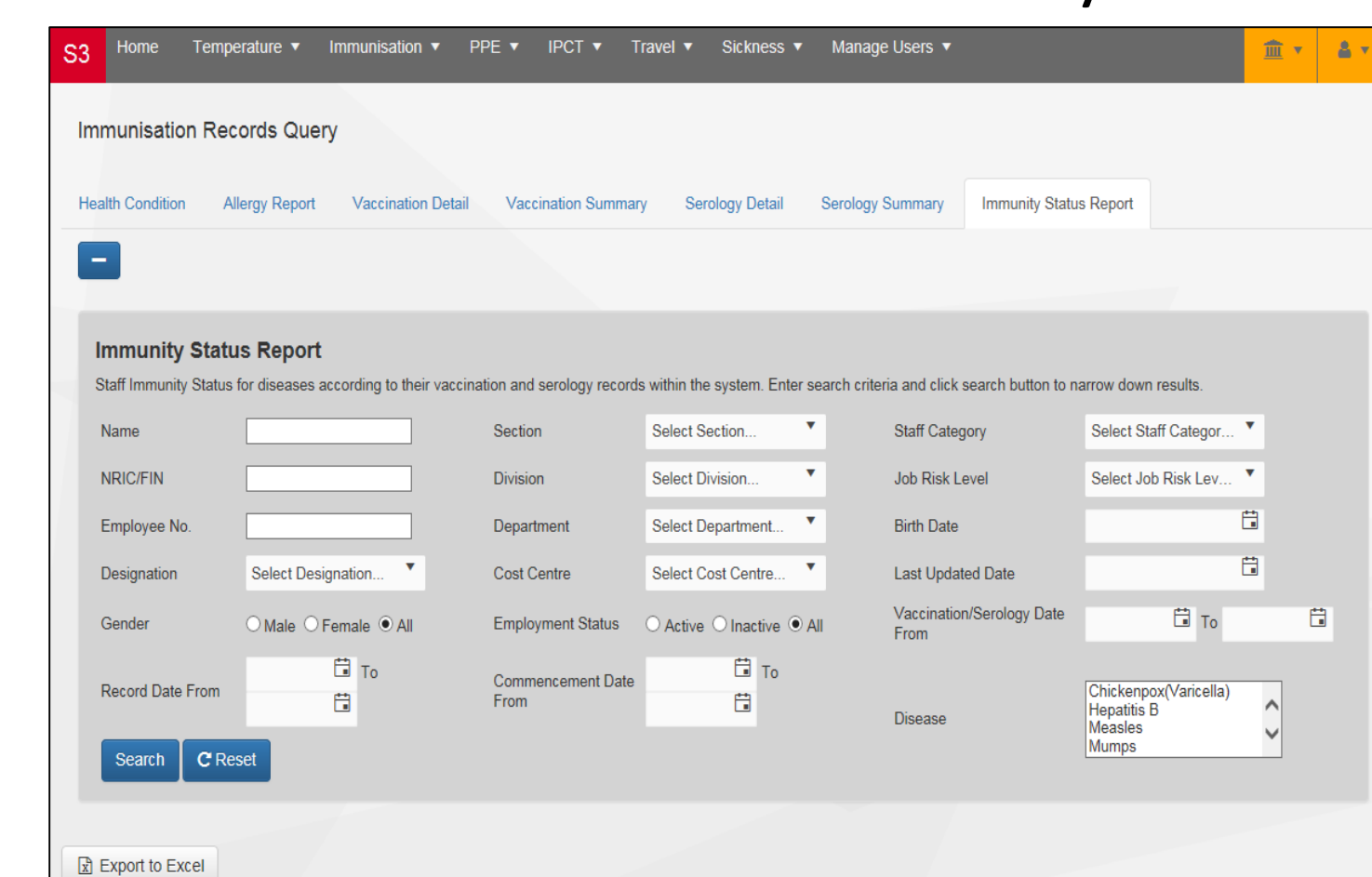
2b. Automated Reminders (Fig.1)
- IPCT Courses
- Temperature Recording
- Vaccination, with configurable schedule

Conclusion

S3 is a system that aids early detection, staff surveillance and efficient implementation of responses during outbreaks. While the first version of S3 is in place, further enhancements are needed to expand the scope of HCW information interfaced from other systems, improve system versatility and user-friendliness.