



RIS –REQUIREMENT

Version-II

Abstract

RIS is required for managing scheduling of RADIOLOGY department work load. The current version comprises of scheduling of appointment, examination and reporting.

Sudeep
mehrotra.sudeep@hotmail.com

Contents

| | |
|---|-----------|
| Overview..... | 3 |
| Registration & Appointment..... | 5 |
| 8.4 Slot Allocation | 8 |
| Examination..... | 10 |
| 9.1 Reporting For Investigation | 11 |
| 10. Room Dashboard..... | 13 |
| 11. Reporting | 14 |
| 11.1 Reporting-Individual | 14 |
| 11.2 Reporting-Page | 15 |
| 11.2 Reporting-Validate & Dispatch | 16 |
| 11.3 Reporting-Confirm & Dispatch..... | 16 |
| 11.2 Adding/Modifying/Updating: Draft Report Templates | 17 |
| 11.2 Reporting Dashboard | 18 |
| Radiology Staff Management | 19 |
| 12. Radiology Staff Dashboard | 19 |

Overview

1. **Patients** in radiology department come with recommended radiological investigation (in short **R-INV**)

2. R-INV are for identification of causes of physiological conditions from which a patient must be suffering. These investigations are performed on specific machines by radiologists who are qualified for particular investigation on specific machines.

3. Each patient R-INV has following features

3.1 *Clinical notes written by doctors recommending these investigations*

3.2 *Pre-condition to be met for the investigation like full bladder or empty stomach etc.*

3.3 *Specific instructions for observing while carrying out investigation*

3.4 *They have priorities i.e normal, urgent and emergency decided by the doctor asking for these investigations. Following factors influence priorities*

- (a) *Age of the patient's i.e. below 6 years and above 75 years*
- (b) *Service status of the patient*

3.5 *The investigation may or may not be carried out along with other R-INV. Thus, the **patient's set of R-INV** is editable wherein an R-INV may be deleted or added by doctors as deemed fit*

3.6 *The R-INV in certain situations may be returned to the recommending doctor with radiologist remarks*

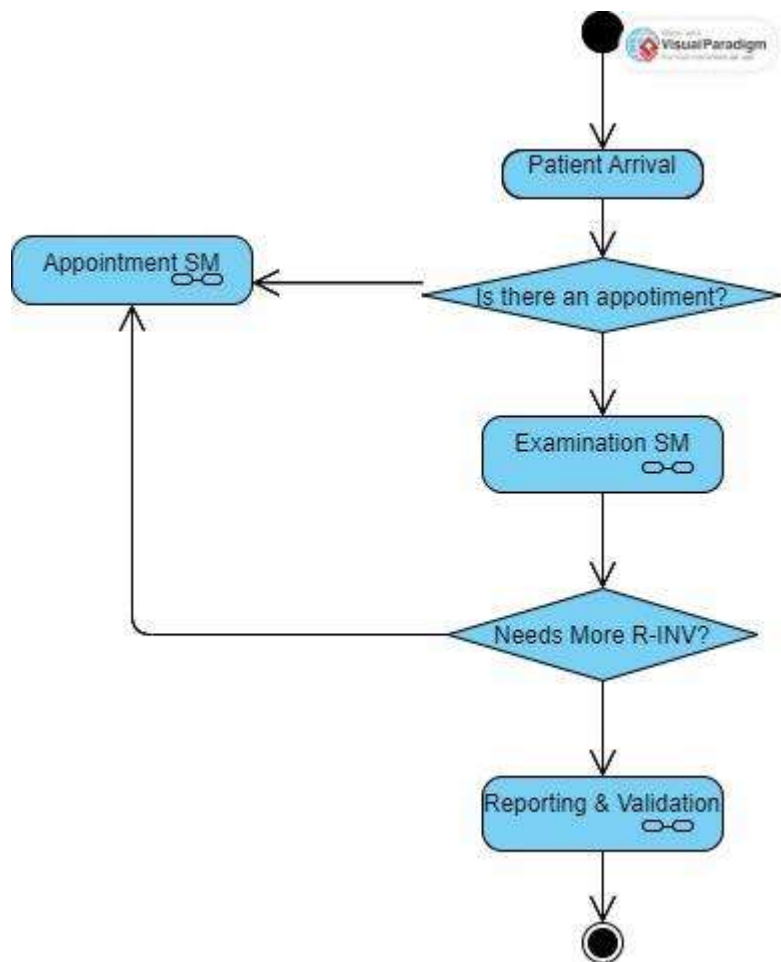
3.7 *Each R-INV within patient's R-INV set will go transit under following states*

3.7.1 *Appointed*

3.7.2 *Dropped*

3.7.3 *Examination completed*

3.7.4 *Examined but waiting for report*



4. A patient may undergo more than one R-INV i.e. X-Ray as well USG. It is also feasible that a particular investigation e.g. USG done under different situations i.e. wherein features stated above may vary. All R-INV mapped to a broad list of ASR.

5. R-INV are carried out in the radiology department which comprises various rooms wherein various radiology machines are installed. These machines may be single in number or multiple depending on their cost and complexity. These machines may have technical breakdown rendering them unavailable for a date and time duration.

6. The hospital or radiology department has following **OBJECTIVES**

6.1 To ensure all patients are accurately investigated without any delay i.e. without any waiting

6.2 No room or machine is overloaded or kept idle

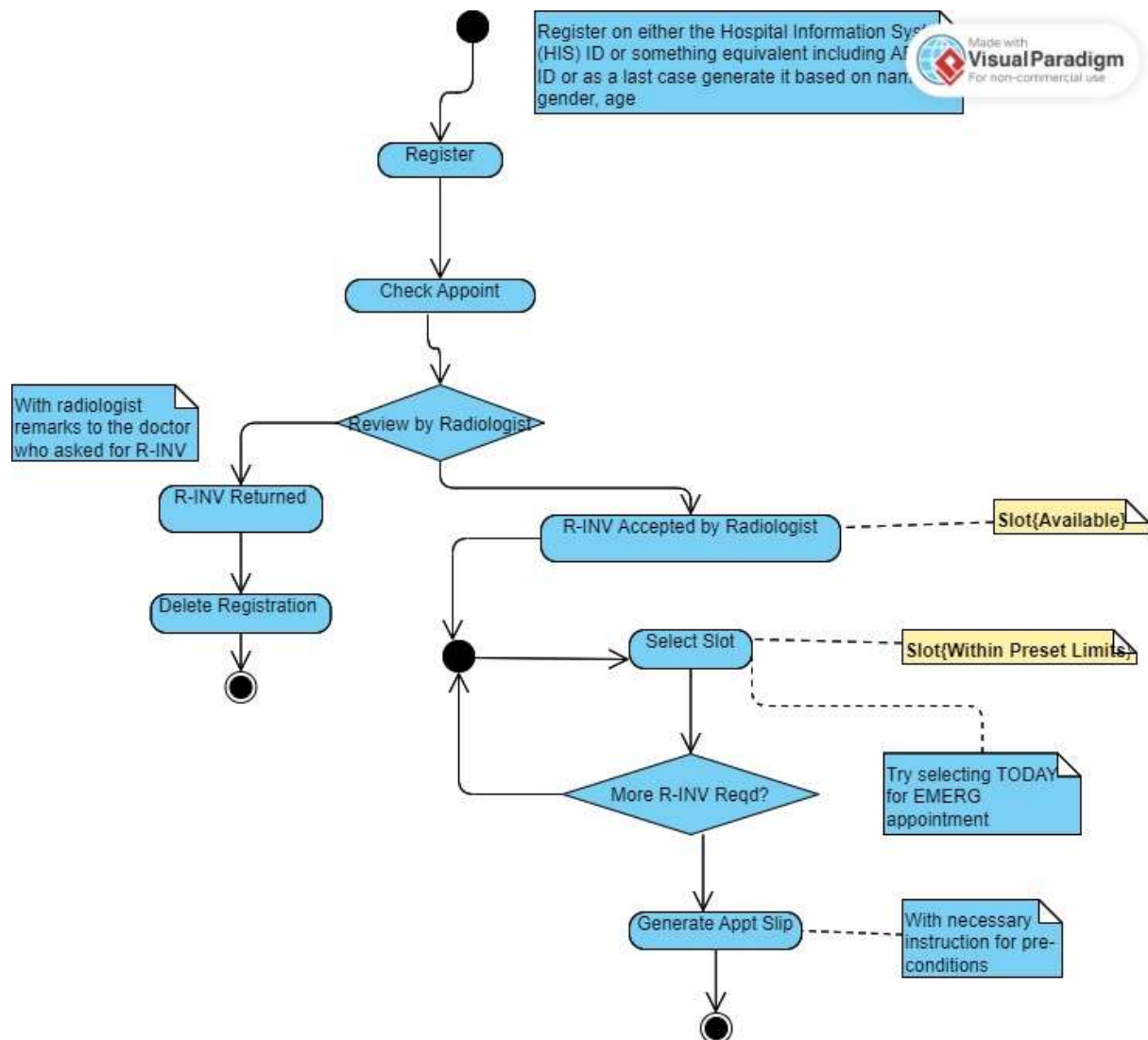
7. In order to ensure the above mentioned objectives the department has to ensure highest feasible availability of

7.1 Radiology machines

7.2 Radiologists

Registration & Appointment

8. Registration & Appointment



Note: If R-INV is not accepted then it is removed from the list of registered patients.

8.1 On patient's reporting to the department his/her basic data is either fetched from HIS (Hospital Information System) or inserted manually.

The interface features a top navigation bar with tabs: X-Ray, USG, CT, MRI, Intervention, MISC, MAMMO, and SPL_INV. Below this is a patient information form with fields for HIS, RANK, NAME, AGE, GENDER, RELATION, SERVICE, and UNIT. A checkbox labeled 'Investigation Ordered/Manually/On HIS' is checked, with a note 'Click if HIS Else Manual'. On the left, a sidebar contains links for Appointment Module, Registration Module, Examination Module, and Reporting Module. On the right, a dropdown menu is open, showing options: X-Ray, Spl Procedure, CDFI, CT, MRI, Mammography, and International Radiography. A 'RADIOLOGY' logo is visible in the bottom right corner.

8.2 Based on the basic information, RIS will identify each patient uniquely with no dependency on HIS or equivalent Patient's ID. Though in case HIS was inserted, it will still be able to search the patient.

8.3 Post registration, the patient will figure under the following states. Based on which his appointment will be given/returned.

8.3.1 Appointed

8.3.2 Pending ie no slot was ever given

8.3.3 Missed ie slot given but missed for whatever reasons

The interface is titled 'ACCEPT INV FROM HIS'. It includes search fields for HIS, NAME, GENDER, and AGE, along with date pickers for 'FROM DATE (default 15 days back)' and 'TO DATE (default TODAY)'. Below these is a table titled 'LIST OF PENDING INVESTIGATION'.

| A | B | C | D |
|--|--------------------------|-------------------------------------|---|
| List of Pending INV | Choose For Accepting | Return to referring doctor | Return to referring doctor with remarks |
| Shows pending investigation of that department i.e. Radiology in red, changes to green if appointment given, changes to balck if INV carried out | <input type="checkbox"/> | | |
| | | <input checked="" type="checkbox"/> | E.g. INV not available, Not a radiology INV. Reasons have to made available in drop box from which doctor will select |

A 'DONE' button is located at the bottom of the interface.

Note: Once DONE is clicked, we move to **Appt Page**.

ApptFrame

APPOINT PAGE

HIS **NAME** **GENDER** **AGE**

| | A | B | C | D |
|---|---|-----------------------------------|---------------|-------------------------------------|
| 1 | INV-NAME | ORDERED-BY | CLINICAL-NOTE | CHOOSE AS GROUP FOR APPT |
| 2 | Drop list of R-INV i.e. X-RAY, USG, CT, MRI, MAMMO, SPL-INV, R-INTERVENTION | Fetch from HIS or insert manually | | <input checked="" type="checkbox"/> |
| 3 | | | | |

TELE NUMBER (from HIS),
editable ☒

WILLING To Get
Advanced ☒

REGISTER For TODAY ☒

Notes

- INV-NAME, ORDERED-BY, CLINICAL-NOTE: If coming from HIS then auto populate with ability to edit.
- INV-NAME is entered in the next row, ORDERED-BY, CLINICAL-NOTE column should get automatically populated from the previous row.
- If chosen as group for appointment, appoint only if available on the same day.
- Editing telephone number is compulsory and will be updated in HIS (if feasible) when check box is clicked. Same goes for "Willing to Get Advanced".
- The appointment module should be able to limit the number of investigation of each type (X-Ray, USG etc.) on any day. But these number should be flexible with privileges to change limited person with authority.
- Ability to change appointment at the radiology department any number of times. Name of the person changing the appointment and remarks should be provided.

8.4 Slot Allocation

Appointment Slot page opens when date/today is selected. On Appointment Slot Page:

- Patient Details are

The screenshot shows the 'APPOINTMENT SLOT' interface. It includes a table for patient appointments with columns for SI No, Patient Particulars, Time, Slot Count, Patient?, INV, INV Details?, Fasting?, Bladder?, Remarks, and Appt Num. Below this is a second table for patient details with columns for SI No, Rel, Rank, Name, INV Name, Time Report, Slot Count, Fasting?, Bladder?, Select to Confirm, and Remarks. At the bottom, there are three buttons: 'CONFIRM APPT?', 'BEYOND PRESET PATIENT LIMIT-CONFIRM?', and 'REGISTER FOR TODAY?'.

automatically populated on successful search on unique ID used for search.

- Columns can be sorted. Default sorting is per time.
- The slot count is the count of R-INV with same time slot (as preset by authorized radiologist)
- On any day (EXCEPT for TODAY), if the SUM of the slot count of the given slot in appointed patients and slot count of the same slot (check marked as well) in proposed patients is more than preset limit for the slot, and insist on clicking the “Beyond Preset Limits-Confirm”
- In such cases on Confirm-Appt would put the appointment in ORANGE colour. When putting appointment beyond preset limit, RIS seeks authentication through password.
- When clicking for TODAY’s appointment, it should be placed in RED.
- The radiologist should have the ability to authorize certain persons to put additional names for appointment (but the name of the person entering should be saved and option for remarks should be available)
- Patient Details: On being clicked

The screenshot shows the 'Patients Details' form. It contains a table with columns: Patients Name, Relation, Num, Rank, Name Serv Pers, Age, Sex, Serv, and Phone. Below the table, there are two buttons: 'RE-APPOINT' and 'CLOSE'.

- Investigation Details: On being clicked

The screenshot shows the 'INV Details' form. It contains a table with columns: INV Name, Ordered By, Clinical Notes, Ordered On, Appt On, Appt Date, Appt By, and Remarks. Below the table, there are two buttons: 'RE-APPOINT' and 'CLOSE'.

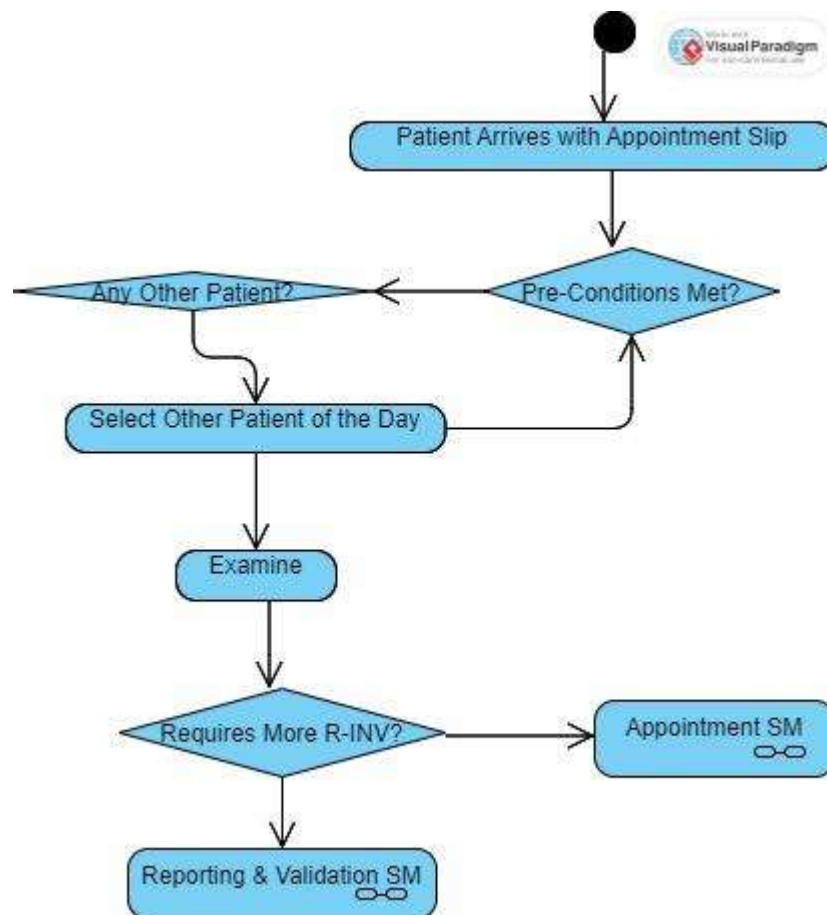
- Re-Appointment takes back one step.

- Registration for TODAY: automatically generated appointment number and then redirects to and fills in the details on the registration module.
- All types of Confirm i.e. Confirm Appointment, Beyond Preset Limits-Confirm, Confirm and Register for Today... generates an Appointment Number (for each INV)
- Appoint Slip:

- If feasible this information may be sent on *patient's phone on WhatsApp/Email ID.*
- Antenatal Scan (Specific to USG) Separate click box for Antenatal scan in USG. For pregnant ladies the system should be able to take into account her LMP date and use that for:
 - Dating scan (6 to 10 weeks)
 - NT/NB Scan (11 to 14 weeks)
 - Anomaly scan (20 to 22 weeks)
 - Third trimester scan (32 to 34 weeks)
 - However, the appointing person should be able to override the dates given.

Examination

9. Examination



9.1 An appointed patient has another state related to examination which will have multiple sub-states

9.1.1 Examination completed in all aspects including reporting

9.1.2 Examination dropped for whatever reasons

9.1.3 Examination pending ie waiting to be examined

9.1.4 Examination done but reports pending for validation by a qualified and authorised radiologist

9.1.5 Need to be re-appointed. In this case, appointment form will reappear

9.1 Reporting For Investigation

- INV Name, Ordered By, Clinical Note columns appear

Appt Num Manual/Barcode or HIS Number SEARCH

HIS Name Gender Age

| | A | B | C | D | E | F | G |
|---|----------|------------------------|---------------|-----------------|-----------|----------|--------|
| 1 | INV Name | Ordered By (Drop List) | Clinical Note | ASR (Drop List) | Token Num | Room Num | Select |
| 2 | | | | | | | |
| 3 | | | | | | | |

URGENT EMERGENCY REGISTER INV

Inv Number Table

| | A | B |
|---|--------------|------------------------|
| 1 | INV Name | Inv Num/ Accession Num |
| 2 | Autopopulate | |

DONE CANCEL

automatically on being searched. However, they can be edited and add more to describe the study e.g. MRI of Multiple sclerosis can include Non-Contrast MRI Brain, Non-Contrast Brain Spline, CEMRI Brain, CEMRI Spine, MR Angiogram. Each will generate separate ASR and INV Number.

- All INV appointed for the day will be shown.
- Default check is YES
- INV Number will appear after register tab is clicked. INV Number is to be generated once register INV is clicked yes, ASR Entered and Register is clicked.
- Each R-INV will have separate INV Number. The INV Number is to be generated once register INV is clicked. Token number entered manually after INV number is generated.
- R = Room Number (Can room number/name/INV e.g. USG, ANC, Doppler, FNAC, CT, MRI as per the choice of the radiologist and selected from Drop Down.
- Same token number for all rooms. Therefore each person has only one Token number for a day. The token number is not deposited in any room.

HIS

Name

Gender

Age

Pending registered INV

TODAY(Default)

START DATE

END DATE

| INV NAME | ORDERED BY | CLINICAL DETAILS | ASR | INV NUM | ROOM NUM | SELECT |
|----------|------------|------------------|-----|---------|----------|-------------------------------------|
| | | | | | | <input checked="" type="checkbox"/> |
| | | | | | | <input type="checkbox"/> |
| | | | | | | <input checked="" type="checkbox"/> |

ADD MORE INV

| INV NAME | ORDERED BY | CLINICAL DETAILS | ASR | ROOM NUM | SELECT |
|----------|------------|------------------|-----|----------|-------------------------------------|
| | | | | @ | <input checked="" type="checkbox"/> |
| | | | | @ | <input type="checkbox"/> |
| | | | | @ | <input checked="" type="checkbox"/> |

GENERATE INV NUM

| INV NAME | INV NUM/ACCESSION NUM |
|----------|-----------------------|
| | |
| | |
| | |

EXAM DONE

Notes:

- On click of EXAM DONE, the system switches to REPORTING module.

10. Room Dashboard

10.1 Each room will have following dashboard displaying

10.1.1 List of patients who had appointment of the day as per slot

10.1.2 List of patients who have reported as per their slots with pre-conditions met

10.1.3 List of patients of the day who have completed their investigation

| | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|-------|-----|-------|-----|-----|-----|------|------|----------|-----------|-----------|-----------|------|
| 1 | SI No | TOK | UR/EM | AGE | SEX | REL | RANK | NAME | INV NAME | TIME ACPT | TIME REPT | EXAM DONE | RMKS |
| 2 | | | | | | | | | | | | | |

Notes

- Once HIS number, Token number (for same date), INV number or Accession Number is entered, the same INV is selected in the table and can be clicked. If the same INV is not present in the filtered table—error message “Name Not in the Filtered Table, please select correct Room Number” is displayed.
- Serial Number is updated every time the list is renewed / filtered. If filtered i.e. number is always from 1,2, 3 etc.
- Room column is hidden but the table is filtered by room number selected at the top.
- UR/EM: If UR i.e. Urgent column is ORANGE else for EM i.e. EMERG it is RED.
- AGE Column: Orange if patient age is < 6 years or > 69 years. (list of all officer rank) is in ORANGE.
- 59 Min < TIME ACPT < 119 Min the column turns ORANGE, if 120 Min < TIME ACPT the column turns RED.
- Once EXAM is done, i.e. column EXAM DONE is clicked, the entire row is turned to GREY.
- RMKS like Absent at ..., Bladder Not Full etc.
- EXAM DONE is filterable and in default shows only PENDING investigation of the day.
- If the table headers are frozen and can be scrolled down, show at least 15 rows at a time.
- Default Sort Sequence: EM, UR, < 6 Years , >120 Min, > 69 years, time reported. Otherwise sort can be applied on any column

11. Reporting

11.1 Reporting-Individual

Once Accession Number/HIS Number is clicked, or particular INV Number is clicked following Report Particular page appears

| HIS | Name | Gender | Age |
|-----|------|--------|-----|
| | | | |

| PENDING REGISTERED INVESTIGATION | TODAY | START DATE | END DATE |
|----------------------------------|-------|------------|----------|
| | | | |

| INV NAME | ORDERED BY | CLINICAL DETAILS | ASR | INV NUM | ROOM NUM | SELECT |
|----------|------------|------------------|-----|---------|----------|-------------------------------------|
| | | | | | | <input checked="" type="checkbox"/> |
| | | | | | | <input type="checkbox"/> |
| | | | | | | <input checked="" type="checkbox"/> |

ADD MORE INV

| INV NAME | ORDERED BY | CLINICAL DETAIL | ASR | DATE | ROOM NUM | SELECT |
|----------|------------|-----------------|-----|------|----------|-------------------------------------|
| | | | | ## | @ | <input checked="" type="checkbox"/> |
| | | | | ## | @ | <input checked="" type="checkbox"/> |

GENERATE ADDITIONAL INV NUMBER

| INV NAME | INV NUM/ACCESSION NUM |
|----------|-----------------------|
| | |
| | |
| | |

GENERATE REPORT

Notes

- Lower Table below button Add More INV
 - INV NAME is editable
 - Room Number to be the same as above
 - INV Number to be generated once button Generate Additional INV Number is clicked.
 - ## The additional INV are to be registered on the date of the initial exam. The date is editable till report is validated.
 - Ordered-By and Clinical Details are options.

11.2 Reporting-Page

| PATIENT DETAILS | | | | | | |
|-----------------|----------|------|---------------------------|-----|-----|------|
| PATIENT NAME | RELATION | RANK | NAME OF SERVICE PERSONNEL | AGE | SEX | WARD |
| | | | | | | |

| INV DETAILS | | | | |
|-------------|------------|------|------------|------------------|
| INV NAME | INV NUMBER | DATE | ORDERED BY | CLINICAL DETAILS |
| | | | | |

EDIT INV DETAILS- GO BACK TO REPORT PARTICULARS PAGE

MODALITY (DROP DOWN)
PART (CHILD) (DROP DOWN)
NORMAL/ABNORMAL (DROP/CHILD)
SAVED FORMATS(DROP DOWN)(CHILD)

REPORT PREVIEW

TYPED BY(DROP LIST)

FILM ISSUED

SAVE DRAFT

FIRST SIGNATORY

NAME SIGNATORY (DROP DOWN)
NAME OF VALIDATING DR (DROP DOWN)
PUT UP FOR VALIDATION
VALIDATE & DISPATCH

DISPATCH PROVISIONAL REPORT

SECOND SIGNATORY

NAME SIGNATORY (DROP DOWN)
NAME OF VALIDATING DR (DROP DOWN)
PUT UP FOR VALIDATION
VALIDATE & DISPATCH

DISPATCH PROVISIONAL REPORT

PREVIOUS RADIOLOGY INVESTIGATION

| INV NAME | INV NUM | DATE | OPEN PREVIEW |
|----------|---------|------|--------------|
| | | | |

PREVIEW OF FORMAT/OLD REPORT

INSERT
COMPARE
EDIT SAVED FORMAT

MY SHORTCUT TO INV PAGES

Notes:

- TYPED BY: auto filled according to sign-in or editable (drop-down).
- FILM ISSUED: Provisional report dispatched "Urgent Film Issued, please return film/contact radiology reporting required"
- DISPATCH PROVISIONAL REPORT: confirm with password.
- Provisional report: watermarked oblique "Provisional Report". In Footer, "This is an urgent provisional report only, requires further evaluation. Please contact Radiology for Final-Report"
- Printing of provisional report is to be disabled.

| | |
|-------------------------------------|---------------------------------------|
| Confirm Dispatch Provisional Report | |
| <input type="password"/> | <input type="button" value="CANCEL"/> |

- The first signatory is auto populated according to login.

- The Validation Box: either any or multiple options of names (each cell a drop list) has to be selected for validation. Any is checked by default.
- Clicking the “Put Up for validation” brings up the secondary box..., and if the second puts for validation third signatory box comes up.

11.2 Reporting-Validate & Dispatch

Confirm Validate & Dispatch Report

Password

CANCEL

11.3 Reporting-Confirm & Dispatch

Once password for provisional / final report is entered correctly and verified by RIS then the PDF preview of the report is generated with following options

Confirm Dispatch

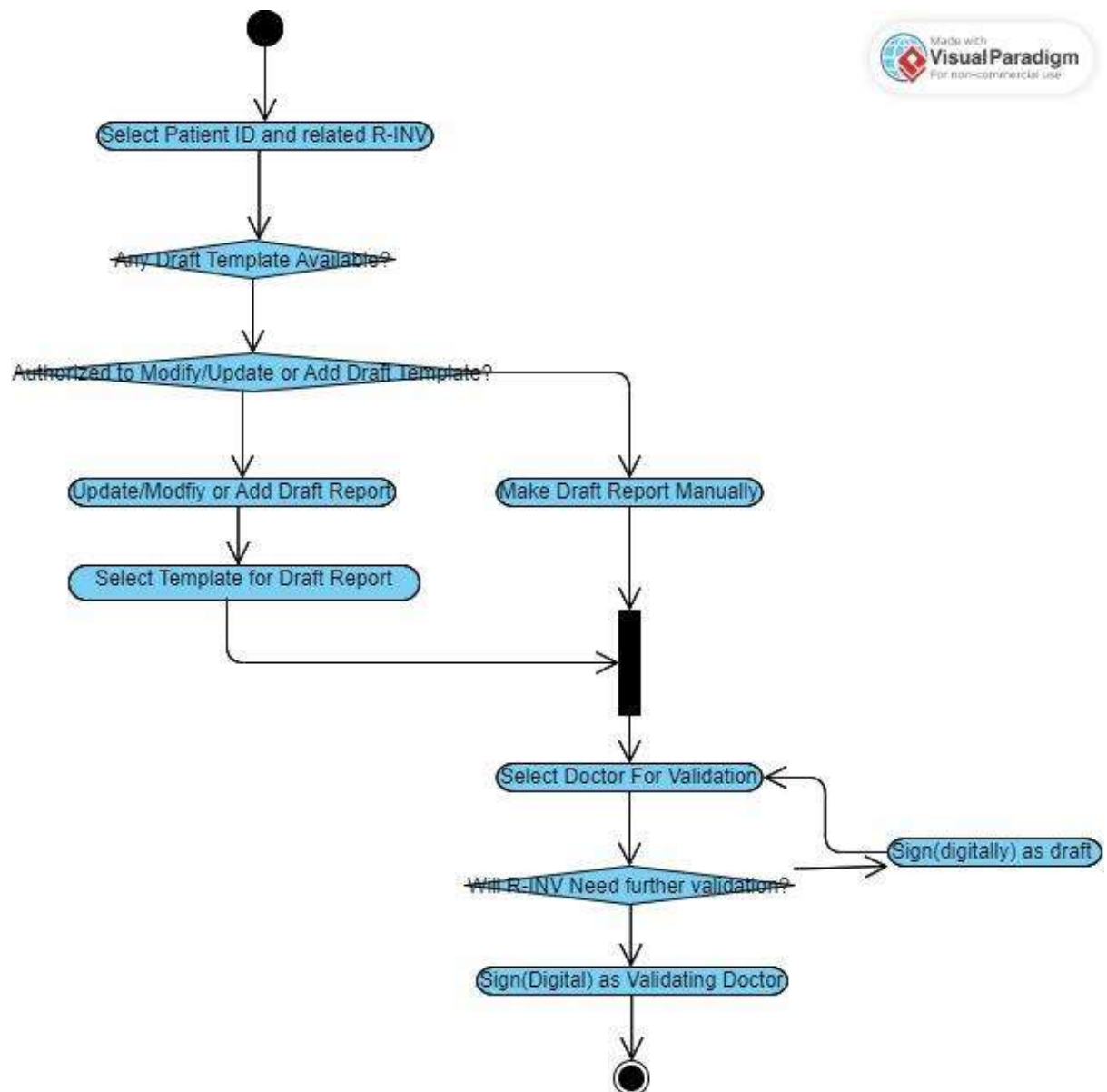
CONFIRM DISPATCH

CANCEL

Notes:

Only if signatory has privileges to validate the INV with all the ASR codes of the report, the validate and dispatch go forward, else an error is displayed “You do not have privileges to validate this report”

11.2 Adding/Modifying/Updating: Draft Report Templates



SAVED FORMATS

| MODALITY (DROP DOWN) | PARTICULAR (CHILD)(DROP DOWN) | NORMAL /ABNORMAL | SAVED FORMAT (DROP DOWN) (CHILD) |
|-------------------------|----------------------------------|---------------------|-------------------------------------|
| | | | |
| | | | |

SAVE CHANGES

CLOSE

DELETE FORMAT

BACK

| MODALITY (DROP DOWN) | PARTICULAR (CHILD)(DROP DOWN) | NORMAL /ABNORMAL | SAVED FORMAT (DROP DOWN) (CHILD) |
|-------------------------|----------------------------------|---------------------|-------------------------------------|
| | | | |
| | | | |

SAVE CHANGES

CANCEL

Save Changes

Password

Save Changes

11.2 Reporting Dashboard

REPORTING (drop down) ▼

FOR INDIVIDUAL

INV/ACCESSION/BARCODE/HIS NUM

TODAY

START DATE

END DATE

ROOM (Drop Down) ▼

ROOM#

ROOM#

ROOM#

ALL

MODALITY i.e. ASR GP(drop down list) ▼

ASR#

ASR#

ASR#

All Rooms all modalities

Default Sort

Report in Patient First

Pure reporting table not examination

Awaiting Validation

| SI No | TOK | UR/EM | AGE | SEX | REL | RANK | NAME | INV NAME | TIME ACPT | TIME REPT | EXAM | RMKS | PRINTED | IN PRINT | AWTG VALDN | START REPORT |
|-------|-----|-------|-----|-----|-----|------|------|----------|-----------|-----------|------|------|---------|----------|------------|--------------|
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

Show Pending

Show All INV of room/modality selected

Blank Report Page

Radiology Staff Management

12. Radiology Staff Dashboard

Radiology Staff Entry

Radiology Staff Personnel Data

| | A | B | C | D | E |
|---|-----------------------|---------------|---------------|-----------|--------------|
| 1 | Pers Num | Rank | Name | Category | Stamp |
| 2 | Drop List of RD Staff | Auto Populate | Auto Populate | Drop List | Create Stamp |

Privileges

| | |
|---------------------------------|--|
| All | <input checked="" type="checkbox"/> Type |
| Validate All | <input checked="" type="checkbox"/> Type |
| Validate USG | Row Type |
| Validate X-Ray | Row Type |
| Edit Appt Control | Row Type |
| Sign Reports | Row Type |
| Give Appt | Row Type |
| Edit Appt | Row Type |
| Give Urgent Films | Row Type |
| Save Changes in Format | Row Type |
| Auth Staff Changes/ Priviledges | Row Type |

TD Data

| | A | B | C | D |
|---|----------|------|----------|--------------|
| 1 | Pers Num | Name | Category | Create Stamp |

Rules & General Information

13. Radiology Investigations

- 13.1 X-Ray
- 13.2 Ultrasound/Doppler
- 13.3 CDFI
- 13.4 CT
- 13.5 MRI
- 13.6 Mammography
- 13.7 Interventional Radiology
- 13.8 Special Procedure