ASCEND
HEALTH INFORMATION TECHNOLOGY

Device Interface Overview

Welch Allyn XScribe Stress ECG

Effective date	2021-09-27
Device interface version	8.0 SU1
Document version	2

Table of Contents

Introduction

The device interface supports import from the following versions of the Welch Allyn XScribe Stress ECG system:

- 3.20.00
- 3.30.05
- 3.31
- 5.11
- 5.12
- 5.13
- 5.14
- 6.1.0
- 6.2.1
- 6.3.0

It also supports the Nuclear, Adult Echo and Pediatric Echo knowledge bases, version 8.0.

Import scope

- Patient demographics
  - Date of birth (disabled by default)
  - Gender (disabled by default)
  - Age (disabled by default)
  - Race (disabled by default)
  - Height
  - Weight
- Study date and time
- Study protocol (exercise and pharmacological)
- Procedure narrative – Exercise
  - Protocol
  - Maximal work rate
  - Duration
  - Termination: see list below
- Procedure narrative – Pharmacologic
  - Study protocol
  - Stress agent
- Stress data per stage – Exercise:
  - Stage name
  - Treadmill speed (disabled by default)
  - Treadmill grade (disabled by default)
  - Metabolic rate (disabled by default)
  - Time into phase
  - Heart rate
  - Systolic and diastolic BP
- Stress data per stage – Pharmacologic:
  - Stage name
  - Dose units or infusion rate units*
  - Time into phase
  - Heart rate
  - Systolic and diastolic BP
- Termination:
  - target HR
  - completion of protocol
  - ischemic ECG
  - atrial arrhythmia
  - vent arrhythmia (or ventricular arrhythmia)
  - chest pain
  - fatigue
  - nausea/headache
  - claudication, dizziness
  - shortness of breath
  - hypotension
- Stress data heart rate response
  - Max HR achieved
  - Target HR (disabled by default)
  - Maximal rate pressure product
- Stress ECG conclusions – Exercise**
  - Exercise time

    - Max ST deviation
    - Duke score
    - Overall ECG results
- Risk factors (disabled by default)
    - Smoker: yes/no
    - Diabetes: yes/no
    - History of MI: yes
    - Family History: yes/no
    - Prior CABG: yes
    - Prior Cath: yes

* For pharmacological stress studies, import populates the stress table with drug names, units, and stage information. Missing are the rates/doses for each stage. ASCEND implemented a solution to automate the recording of rates/doses instead of prompting users to fill in the rates/doses manually via a configuration in the knowledge base. See the pharmacological stress section below for more details.

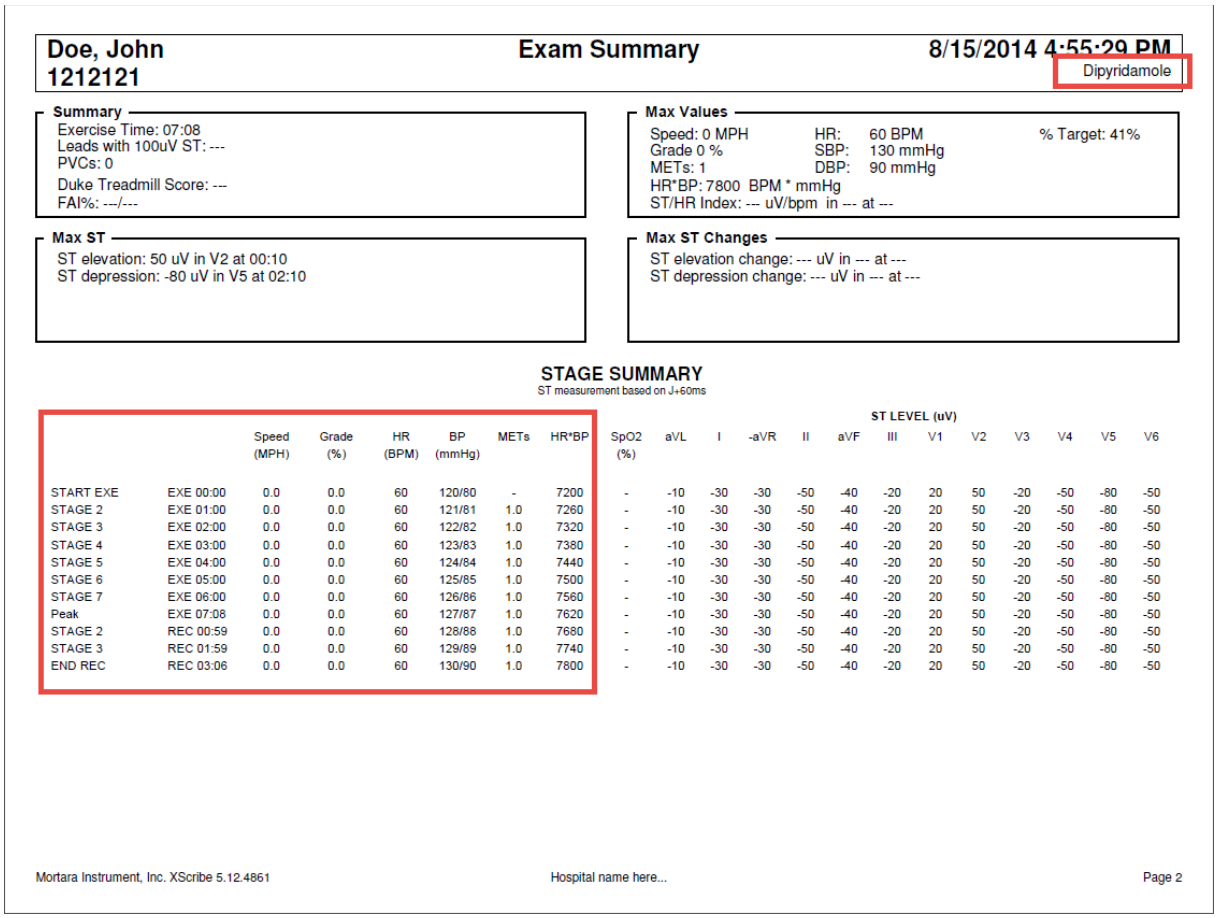
** The stress ECG conclusions import from Welch Allyn XScribe only for the Bruce exercise protocol.

Configurable items

ASCEND uses global configuration states to include/exclude specific sections within the device interface.

Pharmacological stress

The Welch Allyn XScribe device is not capable of providing meaningful stage labels for pharmacological stress test protocol. There is a limitation in Welch Allyn that results in the system always recording the stress exercise stages in the stress table, as illustrated below. The only capability that Welch Allyn allows for pharmacological stress is to let the user record the name of the pharmacological stress test.



Doe, John **Exam Summary** **8/15/2014 4:55:29 PM**
1212121 Dipyridamole

Summary
Exercise Time: 07:08
Leads with 100uV ST: ---
PVCs: 0
Duke Treadmill Score: ---
FAI%: ---/---

Max Values
Speed: 0 MPH HR: 60 BPM % Target: 41%
Grade 0 % SBP: 130 mmHg
METs: 1 DBP: 90 mmHg
HR*BP: 7800 BPM * mmHg
ST/HR Index: --- uV/bpm in --- at ---

Max ST
ST elevation: 50 uV in V2 at 00:10
ST depression: -80 uV in V5 at 02:10

Max ST Changes
ST elevation change: --- uV in --- at ---
ST depression change: --- uV in --- at ---

STAGE SUMMARY
ST measurement based on J+60ms

		Speed (MPH)	Grade (%)	HR (BPM)	BP (mmHg)	METs	HR*BP	SpO2 (%)	ST LEVEL (uV) aVL	I	-aVR	II	aVF	III	V1	V2	V3	V4	V5	V6
START EXE	EXE 00:00	0.0	0.0	60	120/80	-	7200	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 2	EXE 01:00	0.0	0.0	60	121/81	1.0	7260	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 3	EXE 02:00	0.0	0.0	60	122/82	1.0	7320	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 4	EXE 03:00	0.0	0.0	60	123/83	1.0	7380	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 5	EXE 04:00	0.0	0.0	60	124/84	1.0	7440	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 6	EXE 05:00	0.0	0.0	60	125/85	1.0	7500	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 7	EXE 06:00	0.0	0.0	60	126/86	1.0	7560	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
Peak	EXE 07:08	0.0	0.0	60	127/87	1.0	7620	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 2	REC 00:59	0.0	0.0	60	128/88	1.0	7680	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
STAGE 3	REC 01:59	0.0	0.0	60	129/89	1.0	7740	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50
END REC	REC 03:06	0.0	0.0	60	130/90	1.0	7800	-	-10	-30	-30	-50	-40	-20	20	50	-20	-50	-80	-50

Mortara Instrument, Inc. XScribe 5.12.4861 Hospital name here... Page 2

The fundamental issue is that Welch Allyn does not allow a Tech to record pharma protocol steps. The Tech can label a study as being pharmacological but cannot document drug dose per stage. Instead, Welch Allyn sends stage data containing exercise protocol data -- including speed and incline grade information -- for pharmacological studies.

Automated workaround

The device interface does not import the speed, incline grade, metabolic rate, and the stress ECG conclusions (Duke scoring information) even if those are exported from the device during a pharmacological stress. These data elements import only in the exercise stress protocol, where they are appropriate. Furthermore, the stress ECG conclusions (Duke scoring information) only imports for the Bruce exercise stress protocol.

Welch Allyn generates the stage names in the stress table as stages 1 though n. ***The device interface replaces them with the drug name generated from the pharmacological stress protocol name, and it populates the stage information and rate/dose units but not the rate/dose value*** for Adenosine, Dipyridamole, Dobutamine, and Regadenoson, respectively. The scope of stage label replacement does not include the rest and recovery stages.

Because Welch Allyn does not support the export of rates/doses for separate stages of a pharmacological stress table, one solution is to prompt users to fill in the rates/doses manually. ASCEND has implemented a mechanism to automate the recording of rates/doses by creating

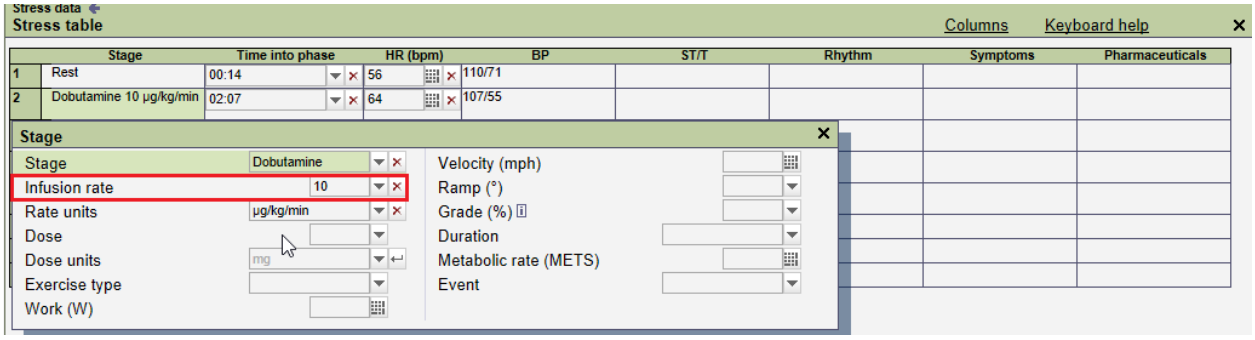
scripts (that get added to the knowledge base via configuration of the latter), to facilitate populating doses into the stress table. E.g., a script would be able to inject the rates/doses 10, 20, 30, and 40 mcg/kg/min to the first four Dobutamine stages in the stress table.

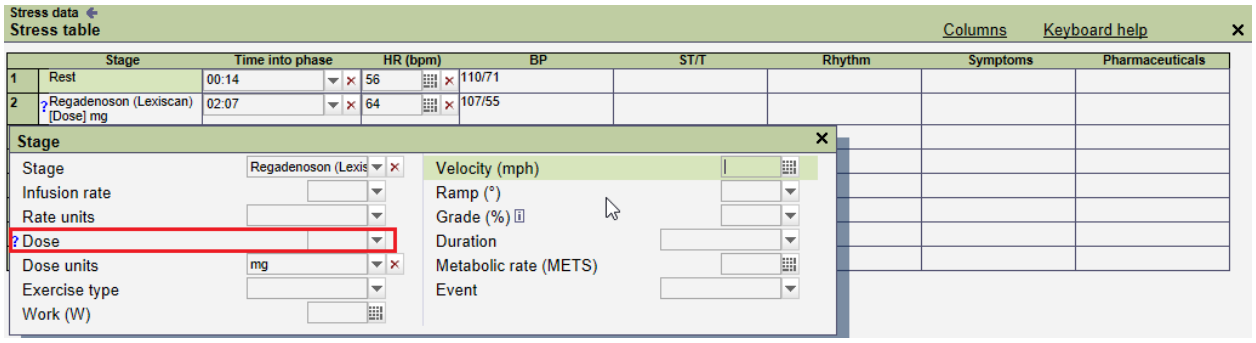
Scripts will not be added to knowledge base, because this is a workaround for a particular device deficiency and general applicability is not in evidence. Scripts will be maintained in configuration documents along with instructions on how to install them:

> //Informatics/8.0/trunk/documents/Knowledge base documentation/Nuclear/Nuclear configuration guide.docx

Manual workaround

In the absence of scripts that automatically inject the rates/doses to the stress table, the technician can manually record the rate/dose in the ASCEND report, as shown in the examples below for rates or doses.





Representative stress report

A representative stress report, after import into the knowledge base and assuming that nothing is disabled, is provided below.

Findings | Report

⚠ Correct function of this knowledge base has not been verified

Bruce protocol

Patient:
MRN: #
Accession: #
Patient location:
Study status:
Facility:

Study date: 03/05/2010
Birth date: 01/14/1954
Age: 55 yr
Birth gender: M
Patient status:

Height: 177.8 cm (70 in)
Weight: 91.4 kg (201 lb)
BSA: 2.14 m²
BMI: 28.9 kg/m²
HR:
BP:

Summary:
1. Stress ECG conclusions: Duke scoring: exercise time of 6 min 15 sec; maximum ST deviation of 1.1 mm; Treadmill angina scale ?; resulting score is 1. This score predicts a moderate risk of cardiac events.
2. New summary item

Recommendations: New recommendation

History and indications: Risk factors: Nonsmoker. Diabetes mellitus. There is no family history of coronary artery disease.

Study data: Procedure: Treadmill exercise testing was performed using the Bruce protocol. The patient exercised for 6 min 15 sec, to a maximal work rate of 7.4 mets. Exercise was terminated due to fatigue.

Cardiac stress table:

Stage	*Time into phase*	*HR*	*BP*
Standing; 1 METS	--	85	173/101 (125)
Start exe; 1 METS	00:00	94	188/118 (141)
Stage 1; 1.7 mph, 10% incline; 4.6 METS	03:00	125	200/117 (145)
Stage 2; 2.5 mph, 12% incline; 7.1 METS	06:00	148	--
Peak exe; 3.4 mph, 14% incline; 7.2 METS	06:15	150	--
Recovery; 0 mph, 0% incline; 5.9 METS	00:55	123	203/105 (138)
End rec; 0 mph, 0% incline; 1 METS	05:44	--	199/118 (145)

Stress results: Maximal heart rate during stress was 151 bpm (92% of maximal predicted heart rate). The maximal predicted heart rate was 165 bpm. The target heart rate was 162 bpm. The rate-pressure product for the peak heart rate and blood pressure was 30247 mm Hg/min.

Stress ECG: Duke scoring: exercise time of 6 min 15 sec; maximum ST deviation of 1.1 mm; Treadmill angina scale ?; resulting score is 1. This score predicts a moderate risk of cardiac events. Summary

Report has not been signed

Duke treadmill score criteria

Risk category	Score	1 year mortality	No ≥75% stenosis	1-VD ≥75%	2-VD ≥75%	3-VD ≥75% or LM ≥75%
Men						
Low	≥+5	0.9%	52.6%	22.4%	13.6%	11.4%
Moderate	+4 to -10	2.9%	17.8%	15.6%	27.9%	38.7%
High	≤-11	8.3%	1.8%	9.1%	17.5%	17.1%
Women						
Low	≥+5	0.5%	80.9%	9.4%	6.2%	3.5%
Moderate	+4 to -10	1.1%	65.1%	14.2%	8.3%	12.4%
High	≤-11	1.8%	10.8%	18.9%	24.3%	46%

References

Mark DB, Hlatky MA, Harrell FE, Lee KL, Califf RM, Pryor DB. Exercise treadmill score for predicting prognosis in coronary artery disease. Ann Int Med 1987; 106:793-800.

Mark DB, Shaw L, Harrell FE Jr., et al. Prognostic value of a treadmill exercise score in outpatients with suspected coronary artery disease. New Engl J Med 1991;325:849-853.

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