Consensus discussion on the approach to evaluation of recreational scuba divers for cardiovascular disease
Notes

• Do not interpret the flow chart and the following discussion as representing a “new” system
  – The goal here is to generate a protocol for CV evaluation of divers that we can publish separately for the benefit of doctors, but which is largely the same as currently used, and which will be incorporated into the current RSTC form with essentially no change in the way it is applied.
Diver candidate completes qu.

No +s

Diver training

Surveillance

What questions?

Symptoms of CV disease or established diagnoses

No diving

Referral for Treatment / evaluation

Positive

Investigation

Successful treatment

Allow diving

No symptoms / diagnoses but risk factors

Negative

Re-evaluation

Successful treatment

No symptoms
What CV questions should appear on the screening questionnaire?
Current questions that should be retained

• Are you over 45 years of age and can answer YES to one or more of the following:
  – Currently smoke a pipe, cigars, or cigarettes
  – Have high cholesterol level
  – Have a family history of heart attack or stroke
  – Are currently receiving medical care
  – High blood pressure
  – Have diabetes
Current questions that should be retained

• Have you ever had or do you currently have:
  – Blackouts or fainting
  – Inability to perform moderate exercise eg walk 1 mile in 12 minutes.
  – Heart attack
  – Angina, heart surgery, or blood vessel surgery
Diagnoses / symptoms / risk factors appearing in the AHA pre-participation screen for young athletes that are **not** on current RSTC screening questionnaire

Maron. Circulation 2007;115:1643

Exertional chest pain/discomfort
Excessive exertional and unexplained shortness of breath/fatigue, associated with exercise
Prior recognition of a heart murmur
Premature death < 50 years due to heart disease in 1 relative
Disability from heart disease in a close relative < 50 years of age
Do you or a close relative suffer from hypertrophic or dilated cardiomyopathy, long-QT syndrome or other ion channelopathies, Marfan syndrome, or clinically important arrhythmias
Diver candidate completes qu. 

No +s

What questions?

Diver training

Surveillance

Symptoms of CV disease or established diagnoses

No symptoms / diagnoses but risk factors

Investigation

No diving

Positive

Successful treatment

Re-evaluation

No symptoms

Allow diving

Referral for Treatment / evaluation
What symptoms of CV disease or established CV diagnoses should prompt an automatic recommendation not to dive?

This may be followed by referral for treatment and/or comprehensive evaluation of suitability to dive.
Current questions

• Have you ever had or do you currently have:
  – Heart attack
  – Angina, heart surgery
Diagnoses / symptoms appearing in the AHA pre-participation screen for young athletes that are not on current RSTC screening questionnaire

Maron. Circulation 2007;115:1643

Exertional chest pain/discomfort

Excessive and unexplained shortness of breath/fatigue, associated with exercise

Hypertrophic or dilated cardiomyopathy

Long-QT syndrome or other ion channelopathies

Marfan syndrome

Heart rhythm problems
Others that should be there

- Pacemaker
- Implanted cardiac defibrillator
- Congenital heart disease
Diver candidate completes qu. → No +s → Diver training → Surveillance

Symptoms of CV disease or established diagnoses → No diving

Investigation

No symptoms / diagnoses but risk factors

Positive → Successful treatment → Re-evaluation

Negative → Allow diving

What symptoms? What diagnoses? What risk factors?

What questions?

Referral for Treatment / evaluation
In the asymptomatic patient with no CV diagnoses, what risk factors for coronary artery or other heart disease should prompt further investigation for inducible cardiac ischemia or other pathology prior to diving?

If negative, the candidate may proceed to diving. If positive, the candidate should be referred for comprehensive evaluation and treatment.
Current questions

• Have you ever had or do you currently have:
  – Unexplained blackouts or fainting
  – Inability to perform moderate exercise eg walk 1 mile in 12 minutes

• Are you over 45 years of age and can answer YES to one or more of the following:
  – Currently smoke a pipe, cigars, or cigarettes
  – Have high cholesterol level
  – Have a family history of heart attack or stroke
  – Are currently receiving medical care
  – High blood pressure
  – Have diabetes
Risk factors appearing in the AHA pre-participation screen for young athletes that are not on current RSTC screening questionnaire

Maron. Circulation 2007;115:1643

Prior recognition of a heart murmur
Premature death < 50 years due to heart disease in 1 relative
Disability from heart disease in a close relative < 50 years of age
Does a close relative suffer from:
  Hypertrophic or dilated cardiomyopathy,
  Long-QT syndrome or other ion channelopathy
  Marfan syndrome
  Important arrhythmias
Diver candidate completes qu.

Symptoms of CV disease or established diagnoses

No diving

Referral for Treatment / evaluation

No +s

Diver training

Surveillance

What questions?

No symptoms / diagnoses but risk factors

Investigation

What symptoms? What diagnoses?

What risk factors?

Positive

Successful treatment

No symptoms

Allow diving

Re-evaluation

Negative
In the asymptomatic patient with no CV diagnoses, but with risk factors for coronary artery or other heart disease, what investigations should the reviewing cardiologist undertake?
Proposed statement

• Where the risk of ischemic heart disease is intermediate or greater the reviewing cardiologist should assess functional capacity to exclude ischemia and to assure the candidate has an adequate exercise capacity to sustain continuous activity at 6 Mets.

• Investigations for other forms of heart disease should be undertaken as appropriate
What forms of longitudinal health surveillance / review are practicable for the recreational scuba diver?
Longitudinal health surveillance may be:

• Compulsory
  – Repeat administration of the standard health screening questionnaire for all continuing education courses
  – Administration of a suitable health screening questionnaire on dive charter vessels

• It is acknowledged that the current RSTC questionnaire may not be suitable for this purpose. A form with a smaller number of highly discriminatory questions will be proposed.
  – The answers must NOT require interpretation by the diving instructor
Longitudinal health surveillance may be:

• Voluntary
  – Based largely on education by training organisations at entry level, and by service organisations like DAN
  – Goals
    • Encourage divers to present for review of suitability for diving after any sustained change in health
    • Encourage divers not to dive and to present for medical review when unwell
    • Encourage divers to have regular health checks with family physician
    • Encourage divers to present for a specific review of cardiovascular status at age 45 for males or 55 for females.
Diver candidate completes qu.

Symptoms of CV disease or established diagnoses

No diving
Referral for Treatment / evaluation

What questions?
No +s
Diver training

Surveillance
What surveillance?

No symptoms / diagnoses but risk factors

Investigation
Positive
Successful treatment
No symptoms
Allow diving
Re-evaluation

What symptoms?
What diagnoses?

What risk factors?

What investigations?