

Supplementary Data

Technical information

Acquisition of audiovisual recordings

	Stethoscope	Microphone	Camera
Athens	Littman Master Classic II	Audio Technica AT899	Panasonic HC-X900
Murcia	Littman Master Classic II	Sony ECM 77B/9X	CANON Legria HF S30
Tromsø	Littman Master Classic II	Sennheiser MKE 2-EW/ EW 112-P G3-G	CANON Legria HF G10
Winnipeg	Littman Master Classic II	Audio Technica ATR 3350	CANON Vixia (Legria) HF S200
Zwolle	Littman Classic II Pediatric	SONY ECM 77B	CANON Legria HF S30

Identical equipment had different names depending on geographic region, i.e. CANON Legria (Europe) is CANON Vixia (North America). Where the recording centres could not obtain identical microphones, alternatives with equal acoustical performance were used. The electret microphones were of similar dimensions to allow insertion into the stethoscope tubing. (An electret microphone is a type of electrostatic capacitor-based microphone which eliminates the need for a polarizing power supply by using a permanently charged material.)

Details

Audiovisual (AV) files were recorded in high definition (1920 x 1080 full HD) to SDHC memory cards. Files were stored in MP4 format. The audio signal was extracted and saved separately (Adobe Audition CC, Adobe) as 48 kHz, 16 bit stereo recording in WAV file format. This file was converted (GoldWave®, Goldwave Inc., St. John's, NL, Canada) to a 10 kHz 16 bit mono file in WAV file format for use with RALEview, an open access program (Pixsoft Inc., Winnipeg, Canada) for acoustical analysis of respiratory sounds. Since airflow had not been simultaneously acquired with the audiovisual recording, the visual information was used to manually indicate inspiration and expiration phases in the RALEview program. The edited file was stored in that program's RAL file format and used to extract information in the frequency (Fast Fourier Transformation analysis) and time domain (Time Expanded Waveform analysis). The respective information was presented in screen captures of spectrograms and sound waveforms. Graphs of average

sound spectra (Origin[®], OriginLab, Northhampton, MA, USA) were generated. A brief summary described the key features of the acoustical analysis.

Quality assurance and evaluation

Questionnaire to determine inclusion of audiovisual recording (FluidSurveys, Ottawa, Canada)

Reference Collection of Respiratory Sounds

Expert Panel

0%

Assessment of audiovisual recordings

Recording 01_ZN003

https://www.dropbox.com/s/p40kmxk1wy78lr1/01_ZN003.wmv

Basic breath sounds

best described as

Comments

Type here

Adventitious sounds

	inspiration	expiration
Fine crackles	<input type="checkbox"/>	<input type="checkbox"/>
Coarse crackles	<input type="checkbox"/>	<input type="checkbox"/>
Rhonchi	<input type="checkbox"/>	<input type="checkbox"/>
Low-pitched wheezes	<input type="checkbox"/>	<input type="checkbox"/>
High-pitched wheezes	<input type="checkbox"/>	<input type="checkbox"/>

Other sounds, e.g. stridor, squawk, friction rub etc.

Please specify in COMMENTS below

Yes

No

Comments

Type here

Should this recording be added to the Reference Collection?

Yes

No

Questionnaire to determine current nomenclature (FluidSurveys, Ottawa, Canada)

Lung sound nomenclature

Terminology in the European languages
English terms are based on Table 1 in Bohadana et al., N Engl J Med 2014;370:744-51.

Please use the text boxes below each term to type in the respective words that are used in your language.

Feel free to type the terms in the alphabet of your language but use English when you add further explanations and comments.

Normal lung sounds

Bronchial breathing

Stridor

Wheeze

Rhonchus

Fine crackle

Coarse crackle

Pleural friction rub

Squawk

There is no term for SQUAWK in my language

Please indicate your country

Problems with translation

Do you experience difficulties in translating terms from the English nomenclature on respiratory sounds to your language?

Yes No

If "yes", please specify which terms

Other terminology

Are there terms in your own language that are other than a direct equivalent of the English term?

Yes No

If so, please explain

Do you think there is a need for a unified international nomenclature on respiratory sounds?

Yes No

Countries and languages

Official languages	EU member states	Sovereign states	Population	Survey (replies)
		Albania	3,020,209	1
		Andorra	85,458	
		Armenia	3,060,631	
German	Austria	Austria	8,223,062	1
		Azerbaijan	9,686,210	
		Belarus	9,608,058	
Dutch, French	Belgium	Belgium	10,449,361	4
		Bosnia and Herzegovina	3,871,643	
Bulgarian	Bulgaria	Bulgaria	6,924,716	2
Croatian	Croatia	Croatia	4,470,534	2
Greek, Turkish	Cyprus	Cyprus	1,172,458	2
Czech	Czech Republic	Czech Republic	10,627,448	2
Danish	Denmark	Denmark	5,569,077	1
Dutch	Netherlands	Netherlands	16,877,351	2
English	United Kingdom	United Kingdom	63,742,977	2
Estonian	Estonia	Estonia	1,257,921	1
Finnish	Finland	Finland	5,268,799	1
French	France	France	66,259,012	4
		Georgia	4,935,880	
German	Germany	Germany	80,996,685	2
Greek	Greece	Greece	10,775,557	2
Hungarian	Hungary	Hungary	9,919,128	2
		Iceland	317,351	
Irish	Ireland	Ireland	4,832,765	1
Italian	Italy	Italy	61,680,122	4
		Kazakhstan	17,948,816	
		(Kosovo)	1,836,529	
Latvian	Latvia	Latvia	2,165,165	2
		Liechtenstein	37,313	
Lithuanian	Lithuania	Lithuania	3,505,738	1
French, German	Luxembourg	Luxembourg	549,680	
Maltese	Malta	Malta	412,655	
		Macedonia	2,091,719	
		Moldova	3,583,288	
		Monaco	30,508	
		Montenegro	650,036	
		Norway	5,147,792	2
Polish	Poland	Poland	38,346,279	1
Portuguese	Portugal	Portugal	10,813,834	2
Romanian	Romania	Romania	21,729,871	2
		Russia	142,470,272	2
		San Marino	32,742	
		Serbia	7,209,764	2

Slovak	Slovakia	Slovakia	5,443,583	1
Slovenian	Slovenia	Slovenia	1,988,292	2
Spanish	Spain	Spain	47,737,941	4
Swedish	Sweden	Sweden	9,723,809	2
		Switzerland	8,061,516	2
		Turkey	76,667,864	2
		Ukraine	44,291,413	2

Sources of information:

European official languages

http://ec.europa.eu/languages/policy/linguistic-diversity/official-languages-eu_en.htm

Sovereign states in Europe

http://en.wikipedia.org/wiki/List_of_sovereign_states_and_dependent_territories_in_Europe#States_with_limited_recognition

Transliteration (non-Latin to romanized text)

<http://www.ushuaia.pl/transliterate/?ln=en>

Responses to survey on lung sound nomenclature

Normal (basic) sounds and bronchial breathing

	Language	Normal lung sound	Bronchial breathing
Albania	Albanian	Respiracion vesikular	Respiracion bronkial
Austria	German	Vesikuläres Atemgeräusch	Bronchialatmen
Belgium	Dutch	Normaal vesiculair ademgeruis, normale longgeluiden	Bronchiaal ademgeruis (ademen)
	French	Bruits respiratoires normaux	Bruit respiratoire bronchique
Bulgaria	Bulgarian	чисто везикуларно дишане, везикуларно дишане	бронхиално дишане
Croatia	Croatian	Normalan plućni zvuk, normalni šum disanja	Bronhalno disanje, bronhalni šum disanja
Cyprus	Greek	Αναπνευστικό ψιθύρισμα, φυσιολογικό αναπνευστικό ψιθύρισμα	Σωληνώδες φύσημα, βρογχικού τύπου αναπνοή
	Turkish	Veziküler ses	Bronşiyal solunum
Czech Rep	Czech	Skřípkové dýchání	Trubicové dýchání
Denmark	Danish	Normal lunge lyd	Bronchial vejtrækning
Estonia	Estonian	Vesikulaarne hingamiskahin	Bronhiaalne (kare) hingamiskahin
Finland	Finnish	Normaali hengityssäni	Bronkiaalinen hengityssäni
France	French	Murmure vésiculaire, bruits auscultatoires normaux	Souffle tubaire, bruits bronchiques
FYROM	Macedonian	нормални белодробни звуци	Бронхијално дишење
Germany	German	Normale Atemgeräusche, seitengleiches Atemgeräusch	Bronchiales Atemgeräusch
Greece	Greek	Φυσιολογικοί αναπνευστικοί ήχοι, φυσιολογικό αναπνευστικό ψιθύρισμα	Βρογχική αναπνοή
Hungary	Hungarian	Normál légzési hangok, puha, sejtes alaplégzés	Hörgi légzés
Ireland	English	Normal breath sounds	Bronchial breathing
Italy	Italian	Murmure vescicolare normale	Respiro bronchiale
Latvia	Latvian	Normāla plaušu skaņa, vezikulāra elpošana	Bronhiāla elpošana
Lithuania	Lithuanian	Normalus plaučių garsas, vezikulinis alsavimas	Bronchinis alsavimas
Netherlands	Dutch	Normaal ademgeruis, vesiculair ademgeruis	Bronchiaal ademgeruis
Norway	Norwegian	Normale lungelyder, vesikulær respirasjonslyd	Bronkial respirasjonslyd, bronkial blåst
Poland	Polish	Szmer pęcherzykowy prawidłowy	Szmer oskrzelowy
Portugal	Portugal	Murmúrio vesicular, sons respiratórios	Ruído brônquico, sons respiratórios
Romania	Romanian	Sunete pulmonare normale, auscultatie normala	Suflu tubar, bronhofonie
Russia	Russian	нормальный легочный звук, Нормальное везикулярное дыхание	Бронхиальное дыхание
Serbia	Serbian	Normalan disajni šum	Bronhijalno disanje
Slovakia	Slovakian	Fyziologický (normálny) posluchový nález, vezikulárne dýchanie	Bronchálne dýchanie
Slovenia	Slovenian	Normalni dihalni šum	Bronhialno dihanje
Spain	Spanish	Murmullo vesicular, ruidos o sonidos respiratorios normales	Soplo tubárico, respiración bronquial
Sweden	Swedish	Vesikulärt andningsljud, normala andningsljud	Bronkiella andningsljud, bronkialandning
Switzerland	German	Vesikuläres atemgeräusch, normales atemgeräusch	Bronchialatmung, bronchialatmen
Turkey	Turkish	Normal akciğer sesleri, veziküler ses	Bronşiyal solunum, tuberi sufl, bronsiyal ses
Ukraine	Ukrainian	Нормальний легеневий подих, Везикулярне дихання	Бронхіальне дихання

Continuous sounds

	Language	Stridor	Wheeze	Rhonchus
Albania	Albanian	Stridor	Weezing	Rale
Austria	German	Stridor	Giemen	
Belgium	Dutch	Stridor	Wheezing	Ronchus
	French	Stridor	Sibilance	Rhonhus
Bulgaria	Bulgarian	стридор	свиркане, свиркаци сухи хрипове	хъркаци сухи хрипове
Croatia	Croatian	Stridor	Zvižduci, fijuk, fićuk,	Нгорас, krupni hgoraci
Cyprus	Greek	Σιγμός, εισπνευστικός συριγμός	Συριγμός	Ρόγχος
	Turkish	Stridor	Wheezing	Ronküs
Czech Rep	Czech	Stridor	Pískot(y)	Vrzot(y)
Denmark	Danish	Stridor	Hvæsen	Ronchi
Estonia	Estonian	Stridor	Vilistav (vilinatega) hingamine	Kuivad räginad, jurinad
Finland	Finnish	Sisäänhengityksen vinkuna, stridor	Uloshengityksen vinkuna	Limarahina (rohina)
France	French	Stridor	Sibilant, sifflement	Râle bronchique, ronchi
FYROM	Macedonian	Стридор	визинг, Пискава хркулка	кркори, Стругава хркулка
Germany	German	Stridor	Juchzen, giemen, pfeifen	Brummen
Greece	Greek	Σιγμός, εισπνευστικός συριγμός	Συριγμός, συρίττοντες	Ρόγχοι
Hungary	Hungarian	Stridor	Zihálál, nehézlégzés	Szörtyözörej, sípolás, búgás
Ireland	English	Stridor	Wheeze	Rhonhus
Italy	Italian	Stridore	Sibili, fischio	Ronco
Latvia	Latvian	Stridors	Sēkšana, čikstoša elpošana, svilpjoša elpošana	Rupjš sauss troksnis
Lithuania	Lithuanian	Stridoras	Sausi švilpianrys karkalai	Sausi birzgiantys karkalai
Netherlands	Dutch	Stridor	Piepende ademhaling, hoogfrequente rhonchi, fluitende rhonchi	Ronchi
Norway	Norwegian	Stridor, ilnspiratorisk hvesing	Piping	Rhoncus, lavfrekvent knatrelyd, pipelyder
Poland	Polish	Stridor	Świsty	Rzężenia
Portugal	Portugal	Estridor	Sibilos	Roncos
Romania	Romanian	Stridor	Wheezing	Ronflante, ronhusuri
Russia	Russian	Стридор	Свистящие хрипы	Хрипы
Serbia	Serbian	Stridor	Zviždanje	Krkor
Slovakia	Slovakian	Stridor, stridorózne dýchanie	Hvízdanie, pískanie	Chrôpky
Slovenia	Slovenian	Stridor	Piskanje, piski	Hropenje, grobi piski
Spain	Spanish	Estridor	Sibilancias	Roncus
Sweden	Swedish	Stridor, stridorösa andningsljud	Pipigoch väsande andning, pipande eller väsande andning	Ronki
Switzerland	German	Stridor	Giemen, pfeifendes atemgeräusch	Ronchi, rasselgeräusch
Turkey	Turkish	Stridor, Hırıltı	Wheeze, sibilan ral, hışıltı, hırıltı, vizing	Ronkus
Ukraine	Ukrainian	Свистяче дихання, стридорозне	Свистяче дихання, ядуга	Хрип

Discontinuous and other sounds

	Language	Fine crackle	Coarse crackle	Pleural friction rub	Squawk
Albania	Albanian	Krepitacione fine	Krepitacione te ashpra	Ferkime pleurale	
Austria	German	Feinblasige RG	Mittel bis grobblasige RG	Pleurareiben	
Belgium	Dutch	Fijne crepitatie, velcro crepitaties	Grove crepitatie, grofblazige crepitaties	Pleuraal wrijfgeruis	
	French	Crépitements fins, craquement de haute fréquence	Crépitements graves, craquement de basse fréquence	Frottement pleural	
Bulgaria	Bulgarian	дребни влажни хрипове	свиркане, свиркащи сухи хрипове	плеврално триене	крепитации, шумно дишане
Croatia	Croatian	Krepitacije, Fina krepitacija	Gruba krepitacija, hropci	Pleuralno trenje	
Cyprus	Greek	Λεπτοί τρίζοντες	Παχείς τρίζοντες	Ήχος τριβής υπεζωκότα	
	Turkish	Ince ral	Kaba ral	Frotman	
Czech Rep	Czech	Chrůpk(y)	Chrop(y)	Pleurální třecí šelest	
Denmark	Danish	Fin knitren	Grov knitren	Pleural gnidningslyd	
Estonia	Estonian	Peenemullilised räginad (krepitatsioonid)	Suuremullilised räginad	Pleura hõõrdumiskahin	
Finland	Finnish	Hienojakoinen rahina	Karkeajakoinen rahina	Pleuran hankausääni	
France	French	Crépitants fins	Gros crépitants	Frottement pleural	Squeak
FYROM	Macedonian	Нежен пукот, фини пукања (влажни шушњеви)	груби пукања	плеврална линија	
Germany	German	Feinblasige Atemgeräusche	Grobblasige Rasselgeräusche, grobblasige Atemgeräusche	Pleurales Reiben	
Greece	Greek	Λεπτοί τρίζοντες	Παχείς (αδρόι) τρίζοντες	Πλευριτική τριβή, ήχος πλευριτικής τριβής	Κρώξιμο
Hungary	Hungarian	Finom ropogás, apró hólyagú szörtyözrej	Durva ropogás, vegyes (közepes és nagy) hólyagú szörtyözrej	Pleurális dörrszörej	Durva zörej
Ireland	English	Fine crackle	Coarse crackle	Pleural friction rub	Squeak
Italy	Italian	Rantoli fini, crepitii fini	Rantoli grossolani, crepitii grossolani	Sfregamento pleurico	Gemiti
Latvia	Latvian	Smalka krepitācija, sīks mitrs troksnis	Rupja krepitācija, rupjš mitrs troksnis	Pleiras berzes troksnis	
Lithuania	Lithuanian	Smulkūs drėgni karkalai	Stambūs drėgni karkalai	Pleuros trynimosi užesys	
Netherlands	Dutch	Fijne crepetaties	Grove crepetaties	Pleurawrijven	Squawk, squeek
Norway	Norwegian	Fine knatrelyder	Grove knatrelyder, blærer	Pleural gnidningslyd, gnidningslyd	Bronkial blåst
Poland	Polish	Trzeszczenia drobne	Trzeszczenia grube	Tarcie opłucnej	
Portugal	Portugal	Crepitações finas, ferveores finos,	Crepitações grossas, ferveores grosseiros	Atrito pleural	
Romania	Romanian	Crepitante fine, raluri crepitante	Crepitante, raluri subcrepitante	Frecatura pleurala	
Russia	Russian	сухие хрипы, мелкопузырчатые влажные хрипы	влажные хрипы, грубые (группопузырчатые) влажгын хрипы	шум трения плевры	
Serbia	Serbian	Kasnoinspirijumski pukoti	Ranoinspirijumski pukoti	Pleuralno trenje	
Slovakia	Slovakian	Jemné praskanie, jemný krepitus	Drsné praskanie, drsný krepitus	Pleurálny trecí šelest	
Slovenia	Slovenian	Fino pokanje, drobni poki	Grobo pokanje, grobi poki	Pleuralno trenje	
Spain	Spanish	Crepitantes finos, crepitantes de fina burbuja, pequeña burbuja	Crepitantes gruesos, crepitantes de gruesa burbuja	Roce pleural	
Sweden	Swedish	Fina krepitationer	Grova rassel, grova krepitationer	Pleurala gnidningsljud, gnidningsljud	
Switzerland	German	Feinblasiges Knisterrasseln, feinblasiges Rasselgeräusch	Feuchtes rasselgeräusch, grobblasiges rasselgeräusch	Pleurareiben	Quäken kreischen
Turkey	Turkish	Ral, krepitasyon, ince ral	Kaba ral	Plevral sürtünme sesi, plevral friction rub	
Ukraine	Ukrainian	Дрібнопузирчастий хрип	Крупнопузирчастий хрип	Шум тертя плеври	Клекотіння