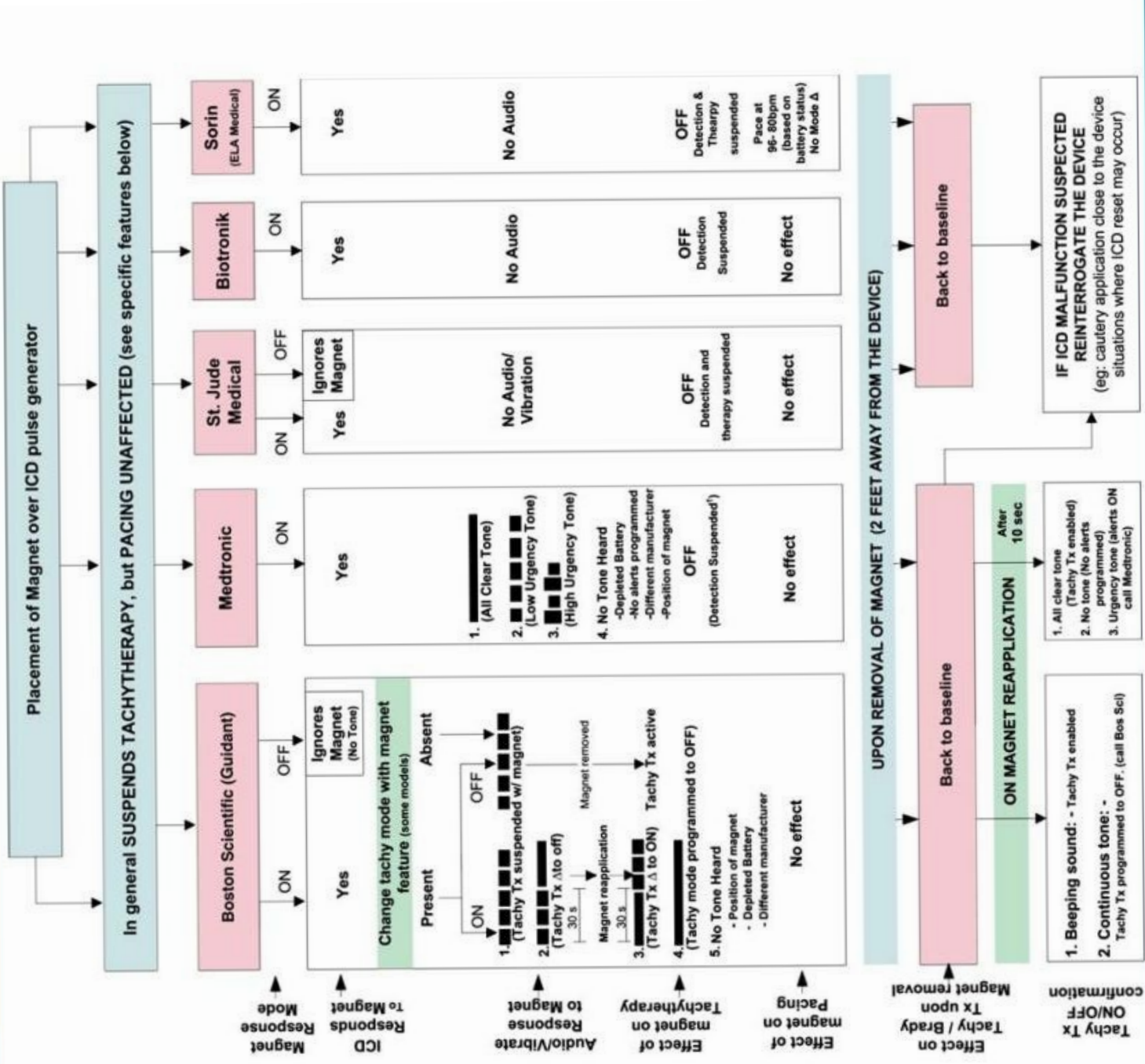


. Figure 3.

Response of pacemakers to magnet placement. In general, magnet application results in asynchronous pacing in all pacemakers with manufacturer-specific exceptions explained in the figure. The first step shows the different magnet response modes programmable in pacemakers and the corresponding electrocardiogram (ECG) responses (Each mode has been explained in detail in the text). If no ECG response is seen on magnet application, the pacemaker might have been programmed to ignore the magnet or might have a depleted battery or one of the different modes shown in the flowchart. Asynchronous pacing occurs at a fixed magnet rate according to the device manufacturer, individual models, and remaining battery life. Pacemaker programmed to DDD pace as DOO, VVI as VOO, and AAI as AOO. On magnet removal, all pacemakers revert to the original programmed pacing mode, except for Sorin pacemakers that undergo a 'capture test' with six pacing outputs at the magnet rate and 94 ms AV delay and then a 'rate test' with two paced outputs at a basic programmed rate and rest AV delay followed by pacing at a preprogrammed rate. Battery statuses: BOL, beginning of life; ERI, elective replacement indicator; ERT, elective replacement time; ERN, elective replacement near; EOL, end of life. The magnet rates at different battery status have been specified for each device manufacturer. At EOL and below, the response of pacemakers to magnet placement is unpredictable across all the manufacturers.

Abbreviations: bpm, beats per minute; AV, atrioventricular, Asynch, asynchronous; Sync; synchronous; †TMT, Threshold Margin Test; PW, pulse width. **St. Jude Medical Pacemaker Models: Affinity®, Identity®, Integrity®, Verity®, Victory®, Zephyr®, Accent®, Anthem®. ##St. Jude Medical Pacemaker Models: Meta®, Microny®, Tempo® (Regency® 100 bpm at BOL and <85 bpm at ERI).

I



Response of implantable cardioverter defibrillators (ICDs) to magnet placement.

In general, on magnet application, tachycardia detection is suspended in all ICDs and hence no anti-tachycardia therapy (Tachy Tx) occurs. The first step shows the programmed response of the ICD to the magnet. The ICD may be programmed to ignore the magnet only in Boston Scientific and St. Jude devices. There is no effect on bradycardia therapy (Brady Tx) function of ICDs, except in Sorin ICDs [pace at 96 beats per minute (bpm) at BOL to 80 bpm at ERI, without any pacing mode change (Δ)]. Removal of the magnet re-enables anti-tachycardia therapy in most of ICDs (except Guidant older devices that have been programmed to 'change tachy mode with magnet'). Note the various audio responses seen in ICDs upon inhibition/suspension of anti-tachycardia therapy (featured only in Boston Scientific and Medtronic ICDs). In Boston Scientific ICDs: Long line, long constant tone: tachy mode is programmed to 'OFF'. Dotted line, initial beeping tones: anti-tachycardia therapy is inhibited for as long as magnet is secured over the ICD; these beeps correspond to the R waves on the electrocardiogram or in newer devices, and beep once per second (each beep is 100 ms long). Dotted line plus long line, initial beeping tones change to long constant tone after 30 s: anti-tachycardia therapy is disabled ('tachy mode' is now programmed to 'OFF') and the magnet can be removed. If the anti-tachycardia therapy had been permanently disabled (i.e. 'tachy mode' had been programmed to 'OFF'), the magnet will have to be re-applied for 30 s or more until the long constant tone reverts to beeping tones. Long line plus dotted line, long constant tone changes to beeping tones after 30 s: 'tachy mode' is programmed to 'ON' (anti-tachycardia therapy will be re-enabled once the magnet is removed). In Medtronic ICDs: Audio tones are heard only if the 'alert tone' (last for 10 s) feature is programmed 'ON'. Long line, long constant tone (all clear tone; all programmed alert parameters are within normal limits). Dotted line, low-urgency tone: 0.5 s 'ON' and 0.5 s 'OFF' for a total of 10 s (one or more of the low-urgency alert parameter needs attention). Dotted line plus line, high-urgency tone: 0.5 s high-frequency tone followed by 0.5 s lower-frequency tone for a total of 10 s (one or more of the high-urgency alert parameter needs attention). If a low- or high-urgency tone is heard, device interrogation is warranted for possible electrical reset. St. Jude ICDs from Atlas® and Epic® II models have a vibration alert feature that warrants possible device interrogation. However, there is no vibration in response to a magnet in these devices.